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THE INFLUENCE OF KAIRIN, THALLIN, HYDROCHINON, RESORCIN, AND ANTIPYRIN, ON THE HEART AND BLOODVESSELS.

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Chemists, for a number of years, have been industriously experimenting, hoping to find a way to produce quinine artificially. The result has been the discovery of a number of substances, some of them belonging to the phenol series of organic compounds, and possessing to an eminent degree the power of reducing hyperpyrexial temperatures.

The literature on these newly discovered antipyretics has already been enriched by a very large number of contributions, and the *Index Medicus* for 1884 and 1885 contains about ninety-four references, of which forty-two are on antipyrin, thirty-four on kairin, nine on resorcin, seven on thallin, and but two on hydrochinon. Most all of these very valuable contributions, however, treat of these remedies as antipyretics only, and of their power of reducing the temperature in fever, while very few, indeed, are devoted to their physiological action. The busy practitioner is too often obliged to remain satisfied with this, having no time to investigate for himself.

No detailed series of experiments on the influence of these remedies upon the circulatory apparatus has, so far, been published, and yet their relation to that apparatus seems all-important, for no intelligent idea of their manner of action can possibly be formed until more is

known about this; nor can the discrepancies in the results, so far as they have been recorded in the different cases, be satisfactorily explained.

It is through the agency of the bloodvessels, and the blood which circulates within them, that not only the temperature of the various organs of the body is constantly being equalized, but also that the superabundant heat, dangerous to the economy, is thrown off. As is well known, the constant or normal temperature peculiar to animals depends upon the maintenance of a proper balance between the amount of heat generated within the organism, and the amount given off to the surrounding medium through the agency of the bloodvessels of the skin, the lungs, etc.

Thus, when heat production is feeble and the temperature of the surrounding medium low, the cutaneous vessels will be found contracted, and the amount of blood which flows through them in a unit of time will, consequently, be relatively small. On the other hand, these vessels will be found dilated, and an abundant flow of blood take place through them, when heat production is increased and the temperature of the surrounding medium is high. Hence, it is evident that any interference with this important function of the circulatory apparatus must, necessarily, greatly influence the temperature of the body, and anything tending to lower the tone of the bloodvessels, or weaken the heart's action, at once deprives the organism of its most effective means for heat regulation. In the condition known as fever, the temperature peculiar to the animal, or its normal temperature, exists no longer, and in place of it we find a higher one.

It is neither possible nor, perhaps, desirable to enter here into the different theories of heat production, nor into a discussion of the gradual evolution of our present theory of the causation of fever, deeply interesting and instructive though they be from a pathological point of view; it is sufficient for our purpose to know the generally admitted fact that any abnormal increase in the temperature of the body can only be due either to an increased heat production or to a decrease in heat radiation, or to both these combined.

Kairin, thallin, hydrochinon, resorcin, and antipyrin, have all been found to reduce abnormal temperatures to a greater or less degree, in almost all febrile disorders promptly though perhaps not permanently. An experimental inquiry into the probable relations of these new antipyretics to the circulatory apparatus seemed, therefore, very desirable, and the results obtained in the following experiments will, it is hoped, quite sufficiently justify the attempt to solve the problem.

In order to work out the details of their influence on the several parts of the circulatory apparatus, we are naturally obliged to turn our attention to the cold-blooded animals. The animals used for experi-

mentation in this inquiry were the bull-frog, or *Rana pipiens*, Linn., the marsh-frog, or *Rana pallustris*, Leconte, and the slider-terrapin, or *Pseudemys rugosa*, Shaw.

For convenience of description, the experiments have been arranged into two groups.

I. Experiments on the work done by the heart when isolated from the central nervous system.

II. Experiments on the bloodvessels: (1) on the flow through the vessels of animals the brains and spinal cords of which had been destroyed; (2) on the lingual vessels of curarized frogs.

In addition to this, a short account of the influence of these drugs upon the corpuscular elements of the blood and the coagulation of blood will be given.

A detailed description of the method and apparatus used in these experiments having already been given in the number of this journal for July, 1885, a short *résumé* will here suffice for an intelligent understanding of how the results were obtained.

In the case of an experiment on the heart, this organ was isolated and left *in situ*. Canulas were then introduced into at least two of the great venous trunks leading directly into the sinus (only one in the frog), and tied as far as possible from the latter so as to keep them as well as the heart under constant and easy observation.

Two canulas were likewise introduced and tied into two of the arterial trunks coming from the ventricle. The venous or inflow canulas were connected with Mariotte's flasks containing the different feeding fluids. The various bottles were so connected by rubber tubes, that the blood from each passed through a common outlet. This outlet tube was in the same way connected with the two inflow or venous canulas leading into the sinus. When different liquids were used, they were, of course, contained in separate Mariotte's flasks, carefully adjusted, so that the pressure under which the liquid flowed out of them was the same for all. In all the experiments on the heart, the "venous pressure" indicates the height above the heart of the bottom of the air-tube of the supplying Mariotte's flasks, expressed in c.m. The supplying-tubes of these flasks had stopcocks on them, by the closing and opening of which any one flask could be used to feed the heart.

The aortic or outflow canulas were all connected with a single tube, from the distal end of which the liquid pumped by the ventricle flowed out and was collected and measured at certain definite intervals. The height of the outlet of this tube is referred to in each experiment as the arterial pressure. A mercury manometer was also connected with the outflow tube near the heart, its pen writing on the smoked paper of a revolving drum on which also a chronograph recorded seconds.

As regards the experiments on the vessels, the method employed con-

sisted in cutting out the heart and inserting canulas into the aortic trunks and one canula into the sinus. The aortic canulas were connected with Mariotte's flasks, placed at a certain height above the body of the animal, from which flasks liquid was made to flow into the arteries. This liquid, after circulating through the capillaries and veins, was drained off from the sinus into a beaker and measured at definite intervals. After this outflow had become constant, circulating fluid plus the drug was substituted for the normal circulating fluid, and the action of the drug on the vessels determined from the change which took place in the amount of the outflow in a unit of time. A decreased outflow indicated increased resistance to the flow of the fluid through the vessels, or, in other words, a constriction of them, and an increased outflow, a dilatation of them. Parallel observations were made on both frogs and terrapins according to the methods thus briefly outlined.

Observations on bloodvessels were also made according to a method recently employed by Krüger, of Berlin, and of which a short account was found in the December number of the *Therapeutic Gazette* for 1885.

In these observations, the frogs were curarized just sufficiently to abolish all voluntary and reflex movements; the animal was then placed on a glass plate armed with a cork ring, on which the tongue was fastened with needles in the usual manner, so as to expose its under surface; being kept moist with normal salt solution, it was examined under the microscope with a magnifying power of sixty diameters. After selecting from the mass of bloodvessels a certain small vein, a capillary and an arteriole, the outlines of which were the most clearly defined, outline drawings of them were made through a camera (Oberhäuser's), and careful measurements of them taken in millimetres. All observations were confined to certain short sections of the vessels thus selected. During the first ten minutes several measurements were made and carefully compared, and when it was found that they became uniform, the drug was either injected into one of the lymph-sacs, or applied in solution or in substance to the surface of the tongue, a short distance away from the point which was directly under the objective, so as not to interfere with the clearness of the field. It was found best to select small sections of clear and well-defined vessels, and confine all subsequent observations and measurements to them, in order to insure uniformity. The drug once administered, drawings of the vessels were made every five minutes, carefully measured and recorded. As a rule, these observations were not continued much over an hour, and some of them had to be discontinued even before the end of that time for reasons hereafter to be stated.

Before, however, taking up the experiments on the heart and bloodvessels, it is perhaps best to consider here the few points ascertained with regard to the action of these drugs upon the blood itself.

The blood used in these experiments to feed the heart, after being isolated, was obtained from a slaughter-house in the immediate vicinity of Washington, and collected directly from the animal; while being drawn it was defibrinated and then put into a clean, dry glass bottle and brought home. The blood was used in from one hour to an hour and a half from the time of collection. At this time, the blood usually had a sort of venous color, and only when the animal had been killed according to the Jewish rite of cutting its throat without previously stunning it by a blow upon the head, did it retain its bright scarlet color up to the time it was used.

The blood obtained in this manner was filtered through a fresh, clean cloth and mixed with an equal quantity of Ringer's salt solution. After some shaking, the mixture generally assumes a bright scarlet color, and this color it retains, as a rule, from three to four hours, or even longer. This mixture is termed normal blood or normal blood mixture in the experiments.

The drugs employed were first dissolved in Ringer's saline and then mixed with the blood; this mixture is called "poisonous blood," or, according to the drugs mixed with it, kairinized or thallinized blood, and so on.

When, in this manner, a portion of the blood was kairinized in the proportions used in the experiments (0.03–0.05 gramme of kairin to 100 c. c. of blood mixture) the mixture quickly changed color, and, within twenty minutes, it had passed from a bright scarlet to an intense dark violet, almost black color. In the case of thallin, the color of the blood changed into a dark brown chocolate tint in about the same period. Hydrochinon changes the scarlet color of normal blood into a cherry-red, the difference being slight but perceptible.

While, then, kairin, thallin, and hydrochinon more or less darken the color of normal blood, the contrary is true of resorcin, which renders it of a slightly brighter red than normal. Besides, while normal blood mixture, as has been mentioned before, after shaking for a few minutes, retains its bright scarlet color for three or four hours, resorcinized blood will remain bright red for days. A small portion of resorcinized blood put into a test-tube and set aside, was found to begin changing its color slightly only after the third day.

Antipyrin does not seem to influence the color of the blood appreciably. but rather tends to preserve the bright red color than darken it.

This peculiar influence of kairin, thallin, and hydrochinon upon the color of the blood was also noticed in the experiments on the frog's tongue, but here it, of course, required a much longer time before it became apparent.

In order to test the influence of these drugs on the process of coagulation, advantage was taken of an observation frequently made while

operating on terrapins. The abdominal cavity of these creatures, as well as the pericardial sac, usually contains a rather large quantity of fluid of an alkaline reaction which has the property of hastening coagulation, and the clot produced by adding some of this fluid to the blood is normally of the consistence of soft jelly.

In one of these experiments, 12 clean watch-crystals were used, into 10 of which 2 c. c. of this abdominal lymph were carefully measured; 0.04 gramme of each of the drugs was then weighed out, and this quantity divided, so that for each drug there were two separate watch crystals containing the drug dissolved in 2 c. c. of the lymph. The 2 remaining crystals were reserved for normal blood, one containing lymph, the other being empty. The drugs having been dissolved in the lymph by gently stirring with a glass rod, a canula was now inserted into one of the arterial trunks of the heart, and the latter allowed to pump a certain quantity of blood into each of the watch crystals, which quantity, so far as could be judged, was about equal to that of the lymph containing the drug in solution. The result was, that in all except resorcin, coagulation took place much sooner in the crystals containing the drugs than in the one which contained normal lymph only, or in the one into which pure blood had been allowed to flow. In the crystals containing kairin, thallin, hydrochinon, and antipyrin, coagulation took place in from 8 to 12 minutes; in the remainder, it took half an hour. The clots produced by kairin, thallin, and hydrochinon were of a very dark brown color, and had the consistency of firm jelly; the other three were of a bright scarlet color. The driest and firmest clot was that which contained antipyrin.

It now remained to ascertain the action of these drugs upon the corpuscular elements of the blood. For this purpose, a small drop of blood was collected upon a clean slide, as it flowed from one of the arterial canulas. This blood was, in all cases, immediately mixed with an about equal quantity of a 2 per cent. solution of the drug in Ringer's saline, covered with a glass cover, and placed under the microscope, the preparation of a specimen occupying only a few seconds. As control specimens, several normal slides were prepared, consisting only of blood and Ringer's saline, in equal proportion. In these normally prepared specimens, the red blood-corpuscles appeared as oval flattened disks, of a light brownish-red color, no nucleus being at all discernible in them. The white corpuscles, much smaller than the red ones, still showed amœboid movements, and in some instances two were seen to fuse into one another; their contents were markedly granular, contrasting strongly with the uniform and homogeneous appearance of the red corpuscles.

In the kairinized specimen, the color of the red corpuscle was found to have entirely disappeared by the time the specimen was brought under the microscope, and a small, sharply defined, and granular nucleus

occupied the centre of the disk. The same change was found to have taken place in the thallin specimen. In the one with hydrochinon, these changes were much less marked; the color, although changed very slightly, was still that of a red blood-corpuscle, and the nucleus was never so well defined, nor so granular and round, as in the case of kairin and thallin. The resorcin specimen showed only a very faint and ill defined large and more oval nucleus within a somewhat indistinctly granular corpuscle; no change from this was noticed during half an hour's observation in any of the specimens. Antipyrin was found to have no appreciable influence upon the red corpuscles, while all the drugs promptly arrested all amœboid movements of the white corpuscles.

These few preliminary observations show quite sufficiently that kairin, thallin, hydrochinon, and antipyrin hasten the process of the coagulation of the blood, and that kairin, thallin, and perhaps, also, hydrochinon, have a destructive influence upon the hæmoglobin of the red blood-globules; they all arrest the movements of the white corpuscles.

I. Kairin.

The contributions to the literature on the physiological action of kairin, so far as I was able to find them, are few in number and limited in extent. Regarding its influence on the circulation, we hear from Queirolo (*Italia Medica*, No. 26, 1886) that under its influence the pulse-rate is lowered from six to eighteen beats per minute, according to the dose; that the arterial pressure is not appreciably affected, but is rather increased than diminished; and that its effect upon the heart is not sufficient to contraindicate its use. Girat (*Thèse de Paris*) finds a constant decrease in the frequency of the pulse and in the number of respirations; from his experiments he concludes that kairin reduces the temperature by its direct action upon the cellular tissues and by retarding the processes of combustion. De Renzi (*Rivista Klin. Terap.*, June, 1883) finds that kairin always diminishes the pulse-rate, and the sphygmograph shows an augmentation in the force of the cardiac contractions.

Regarding the influence of kairin upon the bloodvessels, Queirolo (*Arch. Ital. de Biologie*, fasc. ii. p. 224, 1884) states that he observed a notable dilatation of the peripheral bloodvessels; that in fever patients this dilatation precedes the fall in temperature for some time, and when the temperature rises again, the bloodvessels contract anew and the influence of the remedy passes off. Albertoni and Guaresch (*Centralblatt f. die ges. Therapie*, May, 1885) have arrived at the conclusions that kairin diminishes the frequency of the pulse-rate and causes a lowering in the blood-pressure, also that in small doses it increases the elimination of carbonic acid, diminishes it in large doses; the processes of combustion are retarded and the temperature is reduced by its diminishing influence on heat-production. Brouardel, Loye, and

Dujardin-Beaumetz, having observed the destructive influence kairin exerts upon the red blood-corpuscles, conclude that it reduces temperature primarily by diminishing the respiratory power of the red blood-corpuscles, destroying their hæmoglobin, and hence regard the remedy as dangerous and worthy of condemnation only.

In therapeutical literature a number of fatal cases of collapse, with intense cyanosis, have been reported, over which condition stimulants had no modifying influence. Unpleasant gastro-enteric symptoms, as vomiting and diarrhœa, also profuse sweating, are the almost invariable accompaniments of its administration in full doses. The small number of cases which have been recorded in which it had a more favorable effect seem only to increase, rather than diminish, the uncertainties of its action, and hence it is at least very doubtful that kairin will ever establish for itself a firm foothold among the remedies employed to reduce temperature in fever.

A. The Influence of Kairin on the Heart.

EXPERIMENT VI.—November 4, 1885. Frog 192 grms. Beef's blood and Ringer's saline (1 : 1½). Inflow canula in inferior vena cava. Outflow canulas in right and left aortæ. Venous pressure 5 c.m. Arterial pressure 15 c.m.

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The injections of kairin and atropin into the inflow tubes were made at the time mentioned on the same line in the first column.
3.00	—	—	—	Frog in box.
30	44	30	25°	
35	44	30		
40	44	30		
45	45	29		
50	45	29		
55	45	29	25.6	
4.00	45	29		
05	45	29.5		
09	45	29.5		
13	45	29.5		
16	45	29.5	26	Injected 0.002 grm. of kairin into inflow tube; followed by almost instantaneous diastolic arrest of both auricles and ventricle; heart recovered on arterial pressure being lowered.
42	46	34		
45	47	34		
47	48	34.5		
50	48	34.5		
55	48	34.5	—	Injected 0.001 grm. of kairin; arrest transient, heart quickly and completely recovered.
5.00	46	35		
05	46	35		
10	46	34	27.2	Injected 0.002 grm. of kairin; no complete arrest, but blood ceased to come over; pressure lowered, and heart recovered.
15	46	34		
20	46	30		
25	47	32		

Time P. M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The injections of kairin and atropin into the inflow tubes were made at the time mentioned on the same line in the first column.
5.26	43	30		
27	45	30		
30	47	32		
31	49	34		
33	49	34		
37	49	34	—	Injected 0.003 grm. of kairin.
38	41	17		
40	48	32		
45	48	32	—	Injected 0.003 grm. of kairin, and 0.003 grm. of atropin.
46	47	25		
47	48	32		
52	49	32		
57	49	32		
6.00	49	31	—	Injected same.
01	39	9		
02	49	30		
05	50	30		
10	49	30	—	Injected 0.003 of atropin.
11	49	30		
13	50	28		
15	50	28		
20	50	28	—	Injected 0.003 of kairin.
21	44	24		
22	50	28	—	Injected 0.003 of kairin.
23	30	12		
24	40	25		
30	50	28	—	Experiment ended.

EXPERIMENT V.—Nov. 3, 1885. Terrapin 1600 grms. Beef's blood and Ringer's saline (1 : 1½). Inflow canulas in inferior vena cava and right superior vena cava. Outflow canulas in pulmonary artery and right aorta. Venous pressure 6 c.m. Arterial pressure 22 c.m. Kairinized blood (*a*) contains 0.04 grm. of kairin to 100 c.c. of blood. Kairinized blood (*b*) contains 0.08 : 100.

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	Kairinized blood was supplied to the heart at the time mentioned on the same line in the first column.
3.00	—	—	—	Terrapin in box.
40	36	27	17°	
44	36	27		
46	36	26	—	On kairinized blood (*a*) for one minute.
48	34	27		
50	32	33.5		
54	36	31		
57	36	30	—	On kairinized blood (*a*) for five minutes.
58	36	27		
59	34	30		
4.00	32	34		
01	32	36		
02	31	36		
05	25	50		
08	28	50	—	Ventricle shows increasing relaxation; its systole abnormally prolonged.
11	30	50		
13	32	54		
20	30	52		
23	30	52	—	On kairinized blood (*b*) for one minute.

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	Kairinized blood was supplied to the heart at the time mentioned on the same line in the first column.
4.24	25	44	16°	Heart stopped in diastole; pressure lowered.
30	23	54	—	Heart resumed work; rate still low.
35	25	50		
40	26	50		
43	26	50	—	On kairinized blood for half a minute.
44	—	—	—	No blood coming over; heart's action peristaltic; lowered arterial pressure, and drained off kairinized blood.
48	25	55	—	Heart resumed work; ventricle very large, its systole abnormally prolonged, hence increase in the amount of work done.
51	25	62		
56	26	60		
59	26	60		
5.00	26	52		
05	26	55		
10	28	55	17	
15	28	55		
25	30	52		
28	30	50	—	Injected 0.01 grm. of atropin.
30	36	40		
32	36	35	—	On kairinized blood for two minutes.
35	40	23	—	15 minutes after this observation was taken, blood ceased to come over, heart's movement peristaltic; recovery took place.
40	29	35		
44	29	45		
49	30	52		
53	33	44		
59	32	53		
6.05	35	50	—	Heart's action becoming irregular. Experiment ended.

B. The Influence of Kairin on the Bloodvessels.

EXPERIMENT XX.—Nov. 21, 1885. Terrapin 1205 grms. Ringer's saline. Inflow canulas in right and left aortic trunks. Outflow canulas in sinus. Venous pressure 0. Arterial pressure 16 c.m. Brain and cord destroyed. Constant pressure. Kairinized saline contains 0.005 : 100; in latter part 0 01 : 100.

Time P. M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	The circulating fluids were supplied to the vessels at the time mentioned on the same line in the second column.
3.20	—	—	—	—	Terrapin in box.
50	3.52	19°	16	8	
52	54	—	16	8	
54	56	—	16	8	
56	58	—	16 5	8.2	
58	4.00	—	16.5	8.2	
4.00	02	—	15	7.5	
02	04	—	15	7.5	
04	06	—	15	7.5	
06	08	—	16.5	8.2	
08	10	—	16.5	8.2	
10	12	—	17	8.5	
12	14	—	17	8.5	On kairinized saline for two min.
14	16	—	14	7	

Time P.M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	The circulating fluids were supplied to the vessels at the time mentioned on the same line in the second column.
4.16	4.18	—	18	9	
18	20	—	24	12	
20	22	—	28	14	
22	24	—	16	8	
24	26	—	15	7.5	On kairinized saline for four min.
26	28	—	10	5	
28	30	—	16	8	
30	32	—	30	15	
32	34	—	25	12.5	
34	36	—	17	8.5	
36	38	—	15	7.5	
38	40	—	16	8	On kairinized saline for four min.
40	42	—	13	6.5	
42	44	—	16	8	
44	46	18°	32	16	
46	48	—	24	12	
48	50	—	14	7	
50	52	—	13	6.5	
52	54	—	13	6 5	
54	56	—	13.5	6.7	On kairinized saline for six min.
56	58	—	14	7	
58	5.00	—	23	11.5	
5.00	02	—	27	13.5	
02	04	—	28	14	
04	06	—	18	9	
06	08	—	15	7.5	On kairinized saline for six min.
08	10	—	18	9	
10	12	—	30	15	
12	14	—	44	22	
14	16	—	40	20	
16	18	—	24	12	
18	20	—	18	9	On kairinized saline for eight min.
20	22	—	22	11	
22	24	—	30	15	
24	26	—	38	19	
26	28	—	44	22	
28	30	—	45	22.5	
30	32	—	48	24	
32	34	—	30	15	
34	36	—	24	12	
36	38	—	20	10	
38	40	—	18	9	On kairinized saline for eight min.
40	42	—	25	12.5	
42	44	—	34	17	
44	46	—	44	22	
46	48	—	50	25	
48	50	—	46	43	
50	52	18	40	20	
52	54	19	33	16.5	
54	56	—	28	14	
56	58	—	26	13	
58	6.00	—	26	13	Experiment ended.

EXPERIMENT LX.—January 8, 1885. Frog 104 grms. Curarized. Tongue under microscope magnified 60 diameters. Measurement of vessels made from camera drawings, stated in μ.

Time P. M.	Calibre of Art.	Cap.	Veins.	Remarks.
3.30	4.6	1.0	6.4	
35	4.6	1.0	6.6	Applied 5 drops of 2 per cent. solution of kairin to surface of tongue.
39	5.4	1.8	10.6	
42	5.8	2.2	13 6	
46	6.2	2.8	14.2	
50	6.6	2.6	14.6	Washed away kairin with normal salt solution.
53	6.4	2.0	14.8	
58	6.2	2 0	15.2	
4.05	6.0	2.0	14.2	
10	6.0	1.5	14.6	
15	5.8	1.2	14.6	
20	5.4	1.0	13.4	
25	5.2	1.0	12.8	
30	5.0	1.0	11.2	
35	5.0	1.0	10.8	
40	4.8	1.0	10.2	
45	4.6	1.0	10.2	Circulation still very brisk in all the vessels. Experiment ended.

Experiment VI. shows that kairin, in comparatively small doses, lowers the rate of the heart and the work done; in larger doses it causes diastolic arrest of both auricles and ventricle; atropin, although seemingly retarding this result, is not entirely able to prevent its occurrence.

Experiment V. shows that kairin, in small doses, lowers the rate of the heart but increases the work done; larger doses decrease both rate and the amount of work done; still larger doses cause diastolic arrest of the whole organ; after atropinizing the heart, kairin seems to increase the rate of the heart in small doses, at the same time decreasing the work done; atropin considerably antagonizes the action of kairin upon the rate, and the work done in the case of the terrapin.

A strong solution of kairin injected into the substance of the ventricle causes immediate systolic arrest of the heart of the frog and terrapin.

Experiment XX. shows a slight initial decrease in the amount of outflow during the first few observations, denoting a certain degree of contraction, which rapidly gives way to a dilatation of the arterioles and capillaries. This is a constant occurrence in all the experiments made with regard to this point. The temporary contraction is entirely wanting in the subsequent observations, when dilatation is produced directly after the admission of kairinized saline into the vessels.

In the beginning of this experiment on the vessels, the great veins adjoining the sinus could be seen contracting very regularly; their contractions diminished in frequency after the first few observations with kairinized saline, and ceased altogether while the third observation was taken. The sinus kept on contracting all through the experiment, but

while under normal saline the contractions numbered thirty-two per minute in the beginning, they numbered only four per minute at the close.

Experiment XII. on the frog's tongue, shows that kairin promptly causes a very considerable dilatation of the veins and capillaries, which dilatation exceeds that of the arterioles; it shows also that the capillaries and arterioles recover their normal calibre long before the veins do, a point of some importance.

Four experiments were made with kairin on the frog's tongue, from which this is selected as typical, and as showing all the principal points. When kairin was injected into one of the lymph-sacs in doses of 0.03 gramme, the veins and capillaries became promptly dilated; the arterioles, on the contrary, showed in three cases out of four a slight initial contraction preceding dilatation, and in two cases contraction following dilatation. In no case, however, whether kairin was injected or applied externally in solution, did the arteries show the same prompt and extensive dilatation as did the veins; the veins never returned to their normal calibre as quickly as the arteries and capillaries. When kairin was applied to the tongue in the form of a saturated solution, or in crystals, the tissues were destroyed; the veins, capillaries, and arterioles contracted, and shortly after that they disappeared altogether, and in their places appeared narrow chains of fibrous tissue. Toward the end of an experiment, in which the circulation had become sluggish, and kairin had been applied pretty freely, the veins and their contents had assumed an intense dark violet hue. The arteries and capillaries had remained free from this, apparently indicating a certain affinity of kairin for veins and venous blood. To the naked eye, the tongue looked as if the vessels had been traced out in violet ink.

On several occasions a distinct acceleration of the blood flow in the arterioles was noticed as following the injection of kairin into one of the lymph-sacs; the flow in the veins was slowed.

The conclusions which we may draw from this and other experiments on the frog's tongue with kairin are: (1) that it produces dilatation of the capillaries and veins, which dilatation much exceeds that of the arterioles, which latter is sometimes preceded, sometimes followed, by an abnormal contraction; (2) that it causes a slight acceleration in the current in the arterioles and a slowing of the flow in the small veins.

All the experiments made with kairin on the heart (nine in number), show the great weakening effect it exerts upon the contracting power of the cardiac muscle. In some cases in which this organ happened to be in unusually good working order, and low venous as well as arterial pressure was used, a very slight but transient increase in the rate, and even in the force of its contraction was noticed when the dose was not too large; but this was always quickly followed by signs of general weakening. The entire organ, then, becomes much enlarged, occupying

from twice to thrice its normal volume, its contractions become peristaltic, incomplete, and sluggish; the auricles keep well filled with blood, never emptying themselves completely. As a rule, the auricles are much sooner affected and recover much later than the ventricle. Under these circumstances the rate of the heart is much decreased, the amount of work done is sometimes increased, owing to the relaxed condition of the ventricle, but more often decreased, and, finally, diastolic arrest ensues. The heart presents the color of kairinized blood, which, however, again disappears, but, after repeated kairinization, it becomes permanent—in other words, the color of the blood has become the color of the muscular substance of the heart. From this condition the heart was never found to recover: the organ seems as if gelatinized, moves *in toto*, shrinks, and contracts little by little, responds to neither mechanical nor electrical stimulation, and is to all appearances dead. This condition of the heart may almost at once be produced by injecting a two per cent. solution of kairin into its substance, by which arrest in systole is produced.

The temporary diastolic cardiac arrest which kairin produces is most probably due to its stimulating effect on the terminal filaments of the pneumogastric, and the vascular dilatation to a similar influence on the ganglia of the vaso-dilators. Kairin must also be considered a muscle poison.

From the results of all these experiments, it is quite clear that kairin reduces temperature, both by diminishing heat production and by increasing heat radiation. The distinctive influence it exerts on the red blood-corpuscles, however, and the weakening effect upon the heart, render its employment objectionable and dangerous.

II. Thallin.

The literature on the physiological action of thallin is still more scanty than that of kairin. The only physiological work that I have been able to consult was by Maragliano (*Gazz. d. Osp.*, Milan, 1885, vi. 425–427). According to him, thallin causes a rise, afterward a fall, in the arterial pressure, which fall is attributed to its weakening influence upon the heart, and also to the dilatation it produces in the cutaneous vessels. The frequency of the pulse, as well as that of the respirations, is diminished. By means of the plethysmograph of Mosso, and the calorimeter of Winternitz, Maragliano found that thallin caused considerable dilatation of the cutaneous bloodvessels, which dilatation went hand in hand with the fall in temperature, and the radiation of heat increased as the vessels dilated. The amount of urea and carbonic acid eliminated was found to be diminished. The conclusions at which he arrived were that thallin lowers the temperature by directly diminishing the respiratory capacity of the blood, hence retarding the processes of combustion.

According to Dujardin-Beaumetz (*Therap. Gaz.*, September, 1885), thallin, like kairin, lowers the temperature, not by its influence on the heat centres, but by directly diminishing the respiratory power of the blood and by dissolving out its hæmoglobin. He mentions the case of a tuberculous patient who had received but one gramme of thallin during twenty-four hours. The temperature fell to 89.6° F., and the most strenuous efforts were required to arouse this patient from the state of collapse into which he was plunged.

The cases which have so far been recorded, however, are much more favorable to thallin as an antipyretic likely to have a future than are those of kairin. Alexander (*Centralblatt f. klin. Med.*, Leipsig, 1885, vi. 89–93) used thallin in fourteen cases of febrile disease, and noticed chills and vomiting to occur but once; therefore he was led to consider thallin one of the most valuable of antipyretics, being superior to kairin, though inferior to antipyrin.

According to Mingazzini (*Gazz. d. Osp.*, No. 14, 1885), thallin, as an antipyretic, is superior to both kairin and antipyrin, although hardly to be preferred to the latter.

A. Influence of Thallin on the Heart.

EXPERIMENT VII.—November 6, 1885. Frog 135 grms. Beef's blood and Ringer's saline (1 : 1½). Inflow canula in inferior vena cava. Outflow canulas in two aortic trunks. Venous pressure 2.5 c.m. Arterial pressure 20 c.m.

Time P. M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	Injections of thallin were made into one of the inflow tubes at the time mentioned on same line in first column.
3.25	—	—	—	Frog in box.
55	52	18	26°	
58	52	18		
4.02	52	18.5		
05	52	18.5		
10	52	18	—	Injected 0.005 grm. of thallin.
11	54	16		
12	52	16		
13	52	14	—	Injected 0.01 grm. of thallin.
17	52	14		
18	50	8		
19	50	10	25.2	Auricles three times their normal size, and almost entirely inactive; ventricle larger than normally, contracting incompletely.
25	52	10	—	Injected 0.01 grm. of thallin.
26	50	9		
27	48	8		
29	46	6		
35	44	3		
37	42	2		
42	33	0	—	Heart arrested in diastole.
5.30	—	—	24.6	Heart much smaller than at last observation. Experiment ended.

EXPERIMENT XXXVIII.—December 21, 1885. Terrapin 930 grms. Beef's blood and Ringer's saline (1 : 1). Inflow canulas in hepatic vein and inferior vena cava. Outflow canulas in right aorta and pulmonary artery.

Venous pressure 7 c.m. Arterial pressure 24 c.m. Thallinized blood contained 0.1 grm. of thallin in 100 c.c. of normal blood mixture; atropinized blood 0.01 grm. : 100 c.c.

Time P M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on the same line in the first column.
3.05	—	—	18°	Terrapin in box.
20	25	29.5		
25	25	29.5		
30	25	29		
35	25	29		
40	25	28.5	—	On thallinized blood.
41	27	32		
42	22	30		
43	20	30		
44	18	32		
45	16	30		
46	14	32	—	Auricles 3 to 4 times their normal size; rosy, dark-colored, and contracting imperfectly.
47	14	35		
48	12	36	—	Ventricle much relaxed, contracting sluggishly but completely; cardiac systole abnormally prolonged; on normal blood mixture.
51	18	54	19	
53	25	40		
56	25	36	—	On thallinized blood.
4.00	25	38		
01	22	33		
03	16	19	—	Auricles continue full and large; ventricle large, contractions peristaltic and far from complete.
05	16	15		
07	8	13		
10	7	13		
12	7	13	—	On normal blood mixture.
13	9	22		
15	19	38		
17	22	30		
21	25	25	—	Ventricle beginning to resume its normal dimensions; auricles continue same as previously noted.
4.25	25	22	20	On atropinized blood.
26	25	23		
28	25	25		
30	27	28		
31	27	30	—	On thallinized blood.
33	18	28		
37	18	21.5	—	Entire heart very weak and beginning to grow smaller.
40	17	26		
45	8	17	—	On normal blood mixture.
48	8	18		
52	15	25	—	On thallinized blood.
55	14	14		
5.00	14	10		
05	13	5		
10	11	2	—	This observation was followed by temporary diastolic arrest; on normal blood.
19	25	44		
25	21	21		
30	24	22	—	Ventricle almost completely recovered.
35	24	21	20	Auricles paralyzed beyond recovery. Experiment ended.

B. Influence of Thallin on the Bloodvessels.

EXPERIMENT XXXIV.—December 14, 1885. Terrapin 740 grms. Ringer's saline. Inflow canulas in right and left aortæ. Outflow canula in sinus. Arterial pressure 10. Venous pressure 0. Thallinized saline used in two different proportions, viz., (*a*) 0.1 grm.: 100 c.c.; (*b*) 0.15 grm.: 100 c.c.

Time P. M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	The circulating fluids were supplied to the vessels at the time mentioned on same line in second column.
3.20	3.56	20.4°	—	—	Terrapin in box.
56	58	—	9	4.5	
58	4.00	—	10	5	
4.00	02	—	11	5.5	
02	04	—	10.5	5.2	
04	06	—	11	5.5	
06	08	—	11	5.5	
08	10	—	10.5	5.2	On thallinized saline (*a*).
10	13	—	16	5.3	
13	16	—	18.5	6.2	
16	18	—	22.5	11.2	Off thallinized saline; on normal.
18	20	—	27	13.5	
20	22	20.6	26	13	
22	24	—	22	11	
24	26	—	18	9	
26	28	—	16	8	
28	30	—	14	7	
30	32	—	14	7	On thallinized saline (*a*).
32	34	—	15	7.5	
34	36	—	18	9	
36	38	—	20	10	
38	40	—	24	12	Off thallinized saline; on normal.
40	43	—	35	11.6	
43	45	—	18	9	
45	47	—	15	7.5	
47	50	—	19	6.3	
50	52	—	12	6	
52	54	—	12	6	On thallinized saline (*a*).
54	57	—	21	7	
57	59	—	22	11	
59	5.01	—	24	12	
5.01	03	—	30	15	
03	05	—	32	16	Off thallinized saline (*b*); on normal.
05	07	—	36	18	
07	09	—	30	15	
5.09	5.11	21	21	10.5	
11	13	—	16	8	
13	15	—	14	7	
15	17	—	12	6	
17	19	—	14	7	On thallinized saline (*b*).
19	21	—	18	9	
21	23	—	20	10	
23	25	—	25	12.5	
25	27	—	27	13.5	Off thallinized saline; on normal.
27	29	—	27	13.5	
29	31	—	25	12.5	
31	33	—	22	11	
33	35	—	18	9	
35	37	—	16	8	
37	37	—	15	7.5	
39	41	—	15	7.5	
41	43	21.4	15	7.5	Experiment ended.

EXPERIMENT XLV.—January 2, 1886. Frog 65 grms.; curarized. Tongue observed under microscope magnifying 60 diameters. Measurements of vessels made from camera drawings, stated in μ.

Time A. M.	Calibre of Art.	Cap.	Vein.	Remarks.
10.35	2.8	1.0	5.0	
40	2.8	1.0	5.2	Injected 0.03 grm. of thallin into lymph-sac.
45	3.6	2.0	8.2	
50	3.5	2.2	10.6	
55	3.0	2.2	7.8	Velocity of current apparently quickened in arterioles, slowed in veins.
11.00	3.0	2.2	6.6	
05	2.8	2.0	6.8	
10	2.6	2.0	7.0	
15	1.8	2.0	7.4	
20	1.5	2.0	7.2	Color of blood, especially in veins, dark brown.
30	2.8	2.0	6.5	
40	3.0	1.8	6.4	Experiment ended.

Experiment VII. shows (1) that thallin, in very small doses, temporarily increases the rate of the heart, and only very slightly decreases the work done; (2) in larger doses it decreases both the rate and work, but influencing the latter more than the former; (3) in the largest doses it arrests the heart in diastole.

As to time and degree, thallin affects the different parts of the heart as follows: first, the sinus and great veins adjoining it; second, the auricles; and, lastly, the ventricle. The dose of thallin required to produce cardiac diastolic arrest is about five times as large as that of kairin, producing a similar result.

Experiment XXXVIII. admits of the following conclusions: 1. Thallin, in comparatively small doses, slightly increases the rate of the heart, and considerably increases the work done. 2. Larger doses decrease both the rate and the work done, finally producing diastolic arrest. 3. Atropin retards, but is unable to prevent this result. 4. Repeated thallinization of the heart is followed by a peculiar shrinkage of the entire organ, during which it presents the dark color of thallinized blood. 5. The order in which the different parts of the heart are affected is the same for the terrapin as for the frog. To this must be added that the injection of a 1 per cent. solution of thallin into the substance of the ventricle produces systolic arrest within a few minutes.

From Experiments XXXIV. and XLVII., on the bloodvessels, we may conclude (1) that thallin, in comparatively small doses, produces dilatation of the arterioles, followed by a contraction of the same; (2) it produces dilatation of the capillaries; (3) it causes a much greater and much more permanent dilatation of the small veins than of either

the capillaries or arterioles; (4) under thallin venous blood and the walls of the veins assume an abnormally dark color.

Summing up the results of all these experiments with thallin upon the heart and bloodvessels of the frog and terrapin, we notice, first, the striking similarity which exists between it and kairin, the only difference, in fact, being that thallin has a much less injurious influence upon the ventricle, the auricles and bloodvessels being equally affected by both drugs.

The temporary diastolic cardiac arrest produced by both these drugs, we are inclined to attribute for the most part to their stimulating influence on the terminal filaments of the pneumogastric. The dilatation of the bloodvessels, most probably, is produced by their stimulating effect upon the ganglia of the vasodilators. The subsequent contraction of both heart and arterioles is due to their direct action upon the muscular substance.

Thallin, like kairin, reduces temperature by diminishing heat production, and by increasing heat radiation; as an antipyretic it is less dangerous, but no less objectionable, than kairin, for while its effect upon the ventricle of the heart is less depressing than that of kairin, its influence upon the blood-corpuscles is sufficient to condemn it.

III. Hydrochinon.

According to Brieger (*Arch. f. Anat. u. Phys.*, 1879), hydrochinon produces dilatation of the arterioles and considerable lowering of blood-pressure. The dose required to reduce the temperature caused no change in rhythm, but sometimes a slight decrease in the rate; the pulse, however, became unusually small and soft, and shortly thereafter collapse ensued, the heart-sounds became inaudible, and the impulse of the heart could not be felt. Brieger also found that hydrochinon had a paralyzing influence upon the frog's heart, especially its muscular substance. The heart ganglia, according to Brieger, are only weakened by strong doses, and not at all affected by small ones.

Seifert (*Berl. klin. Woch.*, 1884, xxi. 450–452) recommends hydrochinon as safe and prompt in its action, its administration being accompanied by but slight disturbances; the cerebral symptoms of typhoid patients were very much improved by its use. From the account which Seifert gives us, we take it that hydrochinon, though lowering the pulse-rate at the same time that it reduces the temperature, slightly increases arterial tension, or, at least, does not lower it under doses which are sufficient to cause a fall in the temperature.

A. Influence of Hydrochinon on the Heart.

Experiment XL*a*.—December 22, 1885. Frog 280 grms. Beef's blood and Ringer's saline (1:1). Inflow canula in inferior vena cava. Outflow canulas in two aortic trunks. Venous pressure, at start, 6 c.m. Arterial

pressure 12 c.m. Hydrochinon blood (*a*) contained 0.1 grm. in 100 c.c. of normal blood mixture; Hydrochinon blood (*b*) 0.2:100 c.c.

Time P. M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on same line in first column.
2.30	—	—	—	Frog in box.
3.00	42	22	23°	
05	42	22.5		
10	43	22	—	Venous pressure lowered to 2.5 c.m.
15	43	15		
20	43	15		
25	43	15	—	On hydrochinon blood (*a*).
26	43	16		
27	40	15.5		
28	39	15		
29	39	14.5		
30	37	13	—	Heart larger, and contracting less perfectly than normally.
31	36	13		
32	36	12		On normal blood mixture.
35	38	15	24	
37	40	15		
40	40	15	—	Venous pressure raised to 5 c.m.
45	42	23		
47	42	22.5		
50	42	22	—	On hydrochinon blood (*b*).
52	36	7	—	Great veins, sinus, and auricles quickly paralyzed; three times their normal size; contractions barely perceptible; ventricle much weakened, though still contracting.
53	—	—	—	Blood ceased to come over; venous pressure lowered to 2.5 c.m.
56	21	1		
4.02	32	7		
07	32	7		
15	36	7		
25	40	8.5	25	Ventricle completely recovered; condition of great veins, sinus, and auricles same as previously noted, and apparently beyond recovery. Experiment ended.

EXPERIMENT XXXII.—December 11, 1885. Terrapin 1450 grms. Sheep's blood and Ringer's saline (1:1½). Inflow canulas in inferior vena cava and left superior vena cava. Outflow canulas in pulmonary artery and right aorta. Venous pressure 6 c.m. Arterial pressure 18 c.m. Hydrochinonized blood (*a*) contained 0.05; (*b*) 0.1 grm. of hydrochinon in 100 c.c. of normal blood mixture.

Time P. M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on first line in first column.
3.00	—	—	—	Terrapin in box.
20	26	19	20°	
25	26	18.5		
30	27	18.5		
35	27	18.5		
40	27	18		
45	27	18.5	—	On hydrochinon blood (*a*).
50	25	19		
55	24	22	21	Auricles overdistended; ventricle normal; on normal blood.
4.00	25	19		
05	26	20		

Time P. M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on first line in first column.
4.10	26	20.5	—	On hydrochinon blood (*b*); auricles still in a passive and overdistended condition.
11	26	20		
13	24	23		
14	12	15	—	Auricles and sinuses as above noted; ventricle greatly relaxed; its diastole prolonged; on normal blood mixture.
16	7	13		
18	9	13		
19	11	15		
21	23	30		
30	25	25	21.2°	
35	25	23	—	On hydrochinon blood.
36	25	25		
38	12	12	—	On normal blood mixture.
39	8	8		
40	10	10	—	Condition of heart as previously noted.
45	19	11		
50	24	22	—	Ventricle recovered but discolored; sinus, veins, and auricles paralyzed beyond recovery.
55	26	20	—	
5.00	26	18	21.6	Experiment ended.

B. Influence of Hydrochinon on the Bloodvessels.

EXPERIMENT XLVI.—December 26, 1885. Terrapin 980 grms. Inflow canulas in right and left aortic trunks. Outflow canulas in sinus. Arterial pressure 13 c.m. Venous pressure 0. Hydrochinonized saline (*a*) contained 1 grm. of hydrochinon : 500 of saline; (*b*) 2 grms. : 500 c.c.; (*c*) 3 grms. : 500 c.c.

Time P. M. From	Time P. M. to	Temp. Cent.	Total outflow.	Outflow per min.	The circulating fluids were supplied to the vessels at the time mentioned on same line in second column.
2.40	3.10	—	—	—	Terrapin in box.
3.10	3.12	16°	29	14.5	
12	14	—	31	15.5	
14	16	—	32	16	
16	18	—	33	16.5	
18	20	—	32	16	
20	22	—	31	15.5	On hydrochinon saline (*a*).
22	24	—	28	14	
24	26	—	21	10.5	
26	28	—	12	6	
28	30	—	10	5	
30	32	—	14	7	
32	34	17	12	10.5	
34	36	—	27	13.5	
36	38	—	30	15	
38	40	—	36	18	
40	42	—	37	18.5	
42	44	—	42	21	
44	46	—	56	28	On normal saline.
46	48	—	60	30	
48	50	—	52	26	
50	52	—	50	25	
52	55	—	70	26	
55	58	—	65	21.6	
58	4.03	—	90	19	
4.03	05	18	30	15	On hydrochinon saline (*b*).
05	07	—	31	15.5	

Time P. M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	The circulating fluids were supplied to the vessels at the time mentioned on same line in second column.
4.07	4.09	—	28	14	
09	11	—	31	15.5	
11	13	—	35	17.5	
13	15	—	38	19	
15	17	—	43	21.5	
17	19	—	45	22.5	
19	22	—	75	25	
22	24	—	52	26	
24	26	—	58	29	On normal saline.
26	20	—	48	24	
28	30	19°	45	22.5	
30	32	--	44	22	
32	34	—	44	22	
34	38	—	78	19.5	
38	41	—	63	21	
41	43	—	42	21	
43	45	—	41	20.5	On hydrochinon saline (*c*).
45	47	—	45	22.5	
47	49	—	47	23.5	
49	51	—	55	27.5	
51	53	—	58	29	
53	55	—	58	29	
55	57	—	60	30	On normal saline.
57	59	—	51	25.5	
59	5.01	—	42	21	
5.01	03	—	38	19	
03	05	—	37	18.5	
05	07	—	36	18	
07	09	—	35	17.5	
09	11	—	35	17.5	
11	13	20	36	18	Experiment ended.

EXPERIMENT XL *β*.—December —, 1885. Frog 64 grms; curarized. Tongue, under microscope magnifying 60 diameters. Measurements of vessels made from camera drawings, stated in *μ*.

Time P. M.	Art.	Calibre of Cap.	Vein.	Remarks.
2.30	4.4	0	5.2	No capillaries apparent.
35	4.4	0	5.4	Injected 0.03 of hydrochinon into lymph-sac.
40	4.6	1.5	7.2	Capillaries abundant.
45	4.6	1.5	8.4	
50	4.6	1.5	9.0	
55	4.6	1.5	9.2	Velocity of current quickened in arterioles, slackened in veins.
3.10	4.4	1.2	9.0	
20	4.4	1.2	7.5	
35	4·4	1.2	7.4	Applied 5 drops of one per cent. solution of hydrochinon in saline to surface of tongue.
42	4.6	2.0	8.0	
50	4.8	2.0	9.6	
55	4.4	2.0	9.4	Washed away hydrochinon with salt solu-
4.00	4.0	2.0	8.4	[tion
10	3.6	1.5	8.6	
20	3.2	1.2	8.8	
25	3.2	1.0	8.6	Circulation still brisk in arterioles, abnormally slow in veins.
30	3.4	1.0	8.6	Experiment ended.

Experiment XL*a*. shows (1) that small doses of hydrochinon, in the frog, reduce the rate of the heart and the amount of work done; (2) that larger doses quickly paralyze the great veins, sinus, and auricles in the order in which they are named, while the ventricle is affected but slightly; (3) increasing venous pressure will materially hasten this occurrence.

Experiment XXXII. shows (1) that, in the terrapin, small doses of hydrochinon slightly increase the amount of work done by the heart, but reduce its rate; (2) larger doses rapidly reduce both rate and work, finally arresting the auricles and sinus in diastole, the ventricle, though much weakened, not being affected to that extent; the ventricle recovers quickly and completely, the auricles slowly and imperfectly.

In both the frog and the terrapin the great venous trunks adjoining and communicating with the sinus may be dissected out at some distance from the latter and canulas tied in, so that these veins remain in sight during the whole experiment. Under normal conditions, and as a sign that the venous pressure has been duly proportionate to the capabilities of the heart under observation, cardiac systole may be observed to start with a contraction of these veins, the contraction-wave travelling through the intervening structures until it reaches the ventricle; their contractions, in most cases, are as perfect and complete as are those of the auricles or ventricle. The same blood which flows into the sinus and then runs through the heart, also passes into these veins, and therefore the influence of poisoned blood on them can be observed as well as upon the other structures.

Experiment XLVI. shows that hydrochinon causes at first a contraction, followed by a dilatation of the arterioles and capillaries; large doses seem at once to dilate these vessels.

Experiment XL*β*. shows (1) that hydrochinon produces dilatation of the arterioles and capillaries, which dilatation is followed by an abnormal contraction; (2) that it causes dilatation of the small veins, which dilatation is much more extensive and lasting than that of either the capillaries or arterioles; (3) it quickens the flow in the arterioles and slows it in the veins; (4) it imparts a deep purplish color to the blood flowing in the veins; (5) the effect is the same, whether hydrochinon is injected hypodermatically or is used externally; when injected, muscular twitchings come on, which necessarily interfere with the study of the vessels of the tongue.

From all these experiments made with hydrochinon on the heart and bloodvessels of the frog and terrapin, we must arrive at the conclusion that it reduces temperature mainly by increasing heat radiation, owing to its influence upon the veins, which it largely dilates, and the capillaries and arterioles, which it also dilates, though to a less extent. Through

its influence upon the red blood-corpuscles it probably also diminishes heat production, by an impairment of their respiratory capacity.

The singular but noteworthy fact, observed under the microscope on the frog's tongue and elsewhere, that kairin, thallin, and also hydrochinon change the color preferably of venous blood, seems to point to a peculiar affinity of these substances for such blood, and it is not at all unlikely that the presence of carbonic dioxide in venous blood is the cause of its chemical decomposition underlying the appearance of this phenomenon. The peculiar coloring principle thus set free diffuses itself through the walls of the veins into the neighboring tissues.

When we now compare the action of hydrochinon upon the heart and the bloodvessels of the frog and terrapin, with that of kairin and thallin, the result shows that hydrochinon affects the ventricle of the heart still more favorably than thallin; the auricles, however, are as promptly paralyzed by hydrochinon as they are by thallin, and even kairin. All three largely dilate the veins, for which they show a decided preference, and they also dilate the capillaries and arterioles; the dilatation of the latter, however, is either preceded or followed by an abnormal contraction, especially noticeable when the drug was injected hypodermatically. On hypodermatic injection of all three of the drugs, slight muscular spasm may be seen on the frog's tongue.

The action of hydrochinon, then, being similar to that of kairin and thallin so far as the heart and bloodvessels are concerned, the explanation of its action must, in like manner, be similar (see page 387). The peculiar affinity of kairin, thallin, and hydrochinon for veins and venous blood cannot be explained by these experiments.

IV. Resorcin.

Comparatively little is known about the physiological action of resorcin on the circulatory apparatus. Russo-Giliberti, by means of the cromocitometer of Bizzozero, ascertained that resorcin temporarily increases the hæmoglobin of the blood; he also found that it decreases the elimination of carbonic acid. (*Arch. p. l. Sc. Med.*, Torino, 1883–84, vii. 171–186.)

Resorcin is said to possess decided antiseptic properties, and has frequently been recommended in putrid affections of the naso-pharynx and genito-urinary organs. In fever patients it reduces the temperature in doses of 1.5 gramme, but 3 grammes are often found necessary. A full dose of the drug is generally followed by dizziness, ringing in the ears, reddening of the face, an acceleration of the respiratory movements, and also the pulse-rate; the cutaneous vessels are congested, and the whole surface is bathed in perspiration. Dujardin-Beaumetz found intense visceral, and especially pulmonary, congestion in animals killed by resorcin, and does not recommend its employment as an antipyretic.

A. Influence of Resorcin on the Heart.

EXPERIMENT X.—November 10, 1885. Frog 110 grms. Beef's blood and Ringer's saline (1 : 1). Inflow canula in inferior vena cava. Outflow canulas in right and left aortæ. Venous pressure 3.5 c.m. Arterial pressure 20 c.m. Solution of resorcin used for injection into inflow tube containing 1 grm. : 50 c.c.

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	Injections made at time mentioned on same line in first column.
2.30	—	—	—	Frog in box.
3.10	48	14.5	25°	
15	48	14.5		
20	48	15.5		
25	48	16		
30	48	15.5	—	Injected 0.01 grm. of resorcin.
34	48	15	24	
36	48	15	—	Injected 0.02 grm. of resorcin.
38	46	13.5		
40	46	14		
45	46	15	—	Injected 0.04 grm. of resorcin.
45^{20}	—	—	—	Complete diastolic arrest of both auricles and ventricles; applied atropin in solution (1 : 500) to surface of ventricle.
55	40	18	23	
4.00	42	15	—	Recovery of all parts of heart perfect.
05	42	15		
13	43	14		
16	45	14	—	Injected 0.04 grm. of resorcin.
17	42	5	—	Auricles distended and motionless; ventricle unaffected.
18	42	10		
25	44	13.5	—	All parts of heart recovered.
35	45	13.5	22	Injected 0.05 grm. of resorcin. After 20 contractions, diastolic arrest of the whole heart occurred; pressure lowered.
42	40	10	—	Auricles seem permanently affected; ventricle completely recovered.
52	43	10		
5.00	45	8	—	Experiment ended.

EXPERIMENT XIX.—November 20, 1885. Terrapin 940 grms. Beef's blood and Ringer's saline (1 : 1½). Inflow canulas in left superior and inferior venæ cavæ. Outflow canulas in right and left aortæ. Venous pressure 3 c.m. Arterial pressure 20 c.m. Resorcinized blood contains 1 grm. of the drug in 500 c.c. of normal blood mixture.

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	Circulating fluids were supplied to heart at time mentioned on same line in first column.
3.15	—	—	—	Terrapin in box.
55	33	22	23°	
4.00	32	22		
10	33	22		
24	33	22	—	Raised venous pressure to 7 c.m.
25	34	45		
26	34	46	—	Lowered venous pressure to 3 c.m.
30	33	23	—	On resorcinized blood for one minute.
31	34	20.5		
32	34	16.5	—	Sinus and auricles large and overdistended; their contractions much weakened; ventricle not affected.

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	Circulating fluids were supplied to heart at time mentioned on same line in first column.
4.33	33	16		
35	33	17.5		
39	33	21	24°	
41	33	20.5	—	Heart in normal working order.
43	33	20	—	On resorcinized blood for two minutes.
45	34	12		
47	35	7		
49	35	4	—	Great veins, sinus, and auricles paralyzed; ventricle but slightly weakened.
53	35	12		
57	35	12.5		
5.04	35	12		
10	33	10		
40	34	6	—	Auricles beyond recovery; ventricle in perfect condition. Experiment ended.

B. Influence of Resorcin on the Bloodvessels.

EXPERIMENT XLI.—December 23, 1885. Terrapin 895 grms. Inflow canulas in right and left aortic trunks. Outflow canula in venous sinus. Arterial pressure 20 c.m. Venous pressure 0. Resorcinized saline contained 0.1 : 100 c.c.

Time P. M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	Circulating fluids supplied to the vessels at the time mentioned on same line in second column.
3.26	—	—	—	—	Terrapin in box.
40	42	20°	24	12	
42	44	—	25	12.5	
44	46	—	24	12	
46	48	—	25	12.5	
48	50	—	26	13	On resorcinized saline.
50	52	—	18	9	
52	54	—	34	17	
54	56	—	50	25	On normal saline.
56	58	21	62	31	
58	4.00	—	52	26	
4.00	02	—	40	20	
02	04	—	40	20	
04	06	—	38	19	
06	08	—	41	20.5	
08	10	—	42	21	On resorcinized saline.
10	12	—	48	24	
12	14	—	70	35	On normal saline.
14	16	—	74	37	
16	18	21.6	62	31	
18	20	—	54	27	
20	22	—	54	27	
22	24	—	60	30	
24	26	—	54	27	
26	28	—	54	27	
28	30	—	54	27	On resorcinized saline.
30	32	—	68	34	
32	34	—	85	42.5	On normal saline.
34	36	—	88	44	
36	38	22	85	42.5	
38	40	—	76	38	
40	42	—	65	32 5	
42	44	—	62	31	
44	46	—	60	30	

Time P.M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	Circulating fluids supplied to the vessels at the time mentioned on same line in second column.
4.46	4.48	—	60	30	
48	50	—	64	32	
50	52	—	62	31	
52	54	—	64	32	
54	56	—	65	32.5	
56	58	—	66	33	
58	5.00	—	66	33	
5.00	02	22.6°	65	32.5	
02	04	—	65	32.5	On normal saline.
04	06	—	70	35	
06	08	—	88	44	On resorcinized saline.
08	10	—	85	42.5	
10	12	—	80	40	
12	14	—	75	37.5	
14	16	—	68	34	
16	18	23	65	32.5	Experiment ended.

EXPERIMENT LIII.—January 6, 1886. Frog 86 grms. Curarized; tongue observed under microscope magnifying 60 diameters. Measurements of vessels made from camera drawings, stated in μ.

Time A.M.	Calibre of Art.	Cap.	Vein.	Remarks.
11.20	4.2	1.0	5	
25	4.2	1.0	5.2	
30	4.2	1.0	5.4	
35	4.2	1.0	5.2	5 drops of two per cent. solution of resorcin in saline applied to surface of tongue.
40	4.6	1.4	9.2	
45	5.2	1.6	10.8	Resorcin washed away with saline.
50	5.0	1.4	10.2	
55	5.0	1.0	9.8	
12.00	4.8	1.0	9 0	
05	4 0	1.0	9.0	
10	4.0	1.0	9.0	Surface of tongue very red, presenting the appearance of intense congestion.
15	3.6	1.0	8.6	
25	3.4	1.0	8.2	Experiment ended.

Experiment X. shows (1) that resorcin, in small doses, has no appreciable influence on either the rate of the heart or its work done; (2) larger doses reduce both rate and work; (3) still larger doses produce diastolic arrest; (4) atropin antagonizes its action to a certain extent only; (5) the sinus and auricles are much more quickly affected than the ventricle.

Previous experiments with resorcin on the heart having quite sufficiently demonstrated its strongly paralyzing influence upon sinus and auricles, very low venous pressure was used throughout Experiment XIX. In this manner any possibility of their being overworked was eliminated, and the fact that they were really in an excellent condition and capable of doing twice the amount of work which they were actually performing is shown in the observation taken at 4.25 P. M., at which

time, the venous pressure having previously been raised, the amount of work done was greatly increased.

Notwithstanding this, the veins, sinus, and auricles were promptly paralyzed by moderately large doses of resorcin, and lowering of the venous pressure had henceforth no effect on their condition, and, of course, raising it caused only a passive overdistention.

The ventricle, throughout this experiment and the three others on the terrapin with resorcin, showed a rather remarkable resistance to the influence of this drug, and the only effect it produced was a slight weakening and a considerable reduction in the rate of contraction. Very large doses, however, give rise to temporary diastolic arrest of the heart in the terrapin as well as in the frog.

The rather remarkable and quite unusual effect of resorcin on the rate of the heart's contractions, as shown in this experiment, is the result of the low venous pressure which was used.

From these and other experiments with resorcin on the heart, the conclusions are as follows: (1) Resorcin, in small doses, improves the heart's action; (2) In doses of medium size it paralyzes the sinus and auricles, but has little effect on the ventricle; (3) In very large doses it at once causes diastolic cardiac arrest, the ventricle recovering sooner or later, the auricles rarely ever.

Experiment XLI. on the bloodvessels shows that resorcin causes first contraction, then dilatation of the arterioles and capillaries.

Experiment LIII. shows—(1) That resorcin slightly dilates the arterioles, their dilatation being followed by contraction beyond the normal; (2) That it causes dilatation of the capillaries; (3) That it promptly and largely dilates the small veins, their dilatation far outlasting that produced in the arterioles and capillaries.

A consideration of the results of these experiments leads to the conclusion that resorcin reduces the temperature by increasing heat radiation by the dilatation it produces in the capillaries and veins, especially the latter.

The same quite remarkable preference for the venous side of the heart and vascular system is shown by resorcin in nearly the same degree as by thallin and hydrochinon. Resorcin paralyzes the auricles in doses which seem to improve rather than impair the contracting power of the ventricle, and it largely dilates the veins, while the arterioles are affected but very slightly.

As is the case with kairin, thallin, and hydrochinon, resorcin reduces the rate of beat of the heart probably by a stimulating influence on the terminal filaments of the pneumogastric, and dilates the vessels through a similar influence on the ganglia of the vasodilators. The tonic effect which it has upon the ventricle is most probably due to its direct action upon the muscular substance of the heart. We have, so

far, no explanation of the difference in the action of these drugs upon the two sides of the heart and vascular system. Nevertheless, the fact remains that all of the drugs so far considered possess this property nearly to the same extent. The only difference regarding their influence upon the heart lies in the ventricle. Kairin and thallin, in small doses, exercise but a *temporary* tonic influence over its contraction hydrochinon and resorcin a more *permanent* one. They all quickly paralyze the auricles and lower the tone of the walls of the veins. The natural consequence is that a much greater quantity of blood will be contained in the veins than in the arteries, and its passage from the veins back into the ventricle is greatly impeded, owing to the paralyzed condition of the auricles. Collapse, therefore, ensues; not so much from failure of the action of the ventricle, as from the danger of *bleeding the animal to death into its own veins*, to use the words of Ludwig.

V. Antipyrin.

Bettelheim (*Med. Jahrb. k. k. Ges. d. Aerzte*, Hefte ii. and iii., 1885) found that the injection of antipyrin caused a rise in the temperature over the integument and a fall in the rectum. This rise in the temperature of the integument was accompanied by a fall in the arterial pressure, and lasted for some time after the pressure began to rise; he was, therefore, led to conclude that the reduction in temperature following the administration of antipyrin is due to its causing a dilatation of the peripheral vessels and a contraction of the vessels of the viscera; hence, more blood being carried to the periphery, heat radiation is considerably increased. Bettelheim did not not notice any deleterious action of antipyrin on the heart. Queirolo (*loc. cit.*) also found that it produced a dilatation of the cutaneous bloodvessels, and that this condition of the vessels generally precedes the fall in temperature.

According to Cappola, the action characteristic of antipyrin is that it produces a fall in the temperature, normal or pathological. This apyrexia, he thinks, does not depend upon its retarding the processes of combustion within the organism, for antipyrin has no such influence; nor does it depend upon cardiac depression, for the contractions of the heart are much increased in force, and the blood-pressure is not lowered. In his opinion, which is based upon experiments upon the vessels of the lungs of the frog and the dog, antipyrin produces its characteristic effect by dilating the bloodvessels, and in doing this it facilitates the radiation of heat. This dilatation is, furthermore, said to be independent of the vasomotor contres, for it takes place in the vessels of isolated organs, and is therefore due to a direct action of antipyrin upon the blood-vascular walls, probably to stimulation of the vasodilator nerve ganglia. In order to induce poisoning by this drug, it requires doses which are far greater than those which are necessary for the production of apyrexia.

Death takes place by arrest of respiration. Even when administered in toxic doses, Cappola found that the blood-pressure did not diminish, and the heart continued to beat with great energy, and was finally arrested in systole (*Arch. It. de Biol.*, 1884, fasc. ii. 134). Filehne found the heart after death arrested in diastole, and also Arduin states that antipyrin kills by heart paralysis.

In therapeutical literature we find two cases of collapse reported as occurring after the use of antipyrin in typhoid fever patients. But, with the exception of these two cases, not one of the newly discovered remedies of the class of antipyretics is so favorably spoken of and so generally recommended as is antipyrin. All clinicians, after thoroughly and extensively experimenting with this remedy, agree that it is absolutely safe, and reduces the temperature promptly, and without causing any of the bad symptoms characteristic of the administration of kairin, thallin, etc. The perspiration which sometimes occurs is a relief for the patients, and not at all unpleasant.

Guttmann (*Berl. klin. Woch.*, 1885, xxii. 377, 401) pronounces antipyrin the safest and most powerful of all antipyretics, and Lehmann attributes to it all the good qualities of a perfect antipyretic.

My experiments with this drug are confirmatory of the many good qualities possessed by antipyrin.

A. Influence of Antipyrin on the Heart.

EXPERIMENT XXX.—December 7, 1885. Frog 195 grms. Sheep's blood and Ringer's saline (1 : 1½). Inflow canula in inferior vena cava. Outflow canula in two aortic trunks. Venous pressure 3 c.m. Arterial pressure 10 c.m. Antipyrinized blood contains 1 grm. in 100 c.c. of normal blood mixture.

Time P. M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on the same line in the first column.
3.20	—	—	—	Frog in box.
40	29	10	15.4°	
45	29	10		
50	29	10		
55	29	10		
4.00	29	10		
05	29	10		
10	29	9.5	15.8	
15	30	9.5		
20	30	9.5	—	On antipyrinized blood.
22	29	10		
24	27	10		
26	26	10.5	—	Auricular contractions much more thorough than under normal blood; ventricular systole more complete and considerably [prolonged.
30	25	10.5		
35	23	10		
40	21	10	—	On normal blood mixture.
45	24	9	15.2	
50	24	9		
55	24	9		
5.00	24	8.5	—	On antipyrinized blood.
03	21	7		
06	20	7		

Time P.M.	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on the same line in the first column.
5.09	19	7		
12	19	7		
15	18	6.5	—	Entire heart much smaller than under normal blood; auricles contracting completely; ventricle same, looks whitish
20	18	6.5		[during systole.
25	17	6.5		
30	16	6.2	—	On normal blood.
35	19	7		
40	20	7		
50	21	7	—	Venous pressure raised 2 c.m.
55	25	10		
6.00	28	12	—	Heart in perfect working order.
05	28	12		
10	28	12.5	—	Experiment discontinued.

EXPERIMENT XVIII.—November 19, 1885. Terrapin 1120 grms. Beef's blood and Ringer's saline (1 : 1½). Inflow canula in inferior vena cava. Outflow canulas in right and left aortæ. Venous pressure 7 c.m. Arterial pressure 22 c.m. Antipyrinized blood in different degrees of strength was used.

Time P.M	Rate per min.	Work in c.c. per min.	Temp. Cent.	The circulating fluids were supplied to the heart at the time mentioned on the same line in the first column.
3.10	—	—	—	Terrapin in box.
3.50	31	29	22°	
55	31	28		
4.00	31	29		
05	32	30		
08	32	30		
16	32	30	—	On antipyrinized blood (1 grm : 500 c.c.).
18	32	40		
21	32	41		
24	32	41		
27	32	41	—	Through 500 c.c. of antipyrinized blood; on normal blood.
29	33	31	22.5	
35	33	26		
40	33	25		
45	32	25	—	On antipyrinized blood (2 grms. : 500 c.c.).
47	33	30		
52	32	40		
55	32	40		
58	32	40		
5.00	32	32	—	Through 500 c.c. of antipyrinized blood; on normal blood.
04	33	27		
07	33	26		
10	33	25	—	On antipyrinized blood (4 grms. : 500).
12	33	30		
15	32	35		
18	31	32	22	
20	30	29		
22	30	25		
25	29	25	—	Through 500 c.c. of antipyrinized blood;
27	30	26		[on normal blood.
29	30	30		
31	31	30		
33	31	26		
40	33	25	—	Experiment ended.

B. *Influence of Antipyrin on the Bloodvessels.*

EXPERIMENT XXIV.—December 5, 1885. Terrapin 870 grms. Inflow canulas in right and left aortæ. Outflow canula in sinus. Arterial pressure 12 c.m. Venous pressure 0. Antipyrinized saline contained 1 grm. of antipyrin to 100 c.c. of Ringer's saline.

Time P.M. From	to	Temp. Cent.	Total outflow.	Outflow per min.	
2.15	2.45	26.6°	—	—	Terrapin in box.
45	47	27.2	12	6	
47	49	—	11.5	5.7	
49	51	—	12	6	
51	53	—	12	6	
53	55	—	13	6.5	
55	57	—	13	6.5	
57	59	—	13	6.5	
59	3.01	—	13	6.5	On antipyrinized saline.
3.01	03	28	13	6.5	
03	05	—	19	9.5	
05	07	—	35	17.5	
07	09	—	46	23	Off antipyrinized saline.
09	11	—	50	25	
11	13	—	50	25	
13	15	—	48	24	
15	17	—	42	21	
17	19	—	40	20	
19	21	—	37	18.5	
21	23	—	30	15	
23	25	—	28	14	
25	27	—	28	14	
27	29	28.4	28	14	
29	31	—	28	14	On antipyrinized saline.
31	33	—	28	14	
33	35	—	35	17.5	
35	37	—	40	20	
37	39	—	48	24	Off antipyrinized saline.
39	41	—	50	25	
41	43	—	48	24	
43	45	—	44	22	
45	47	—	42	21	
47	49	—	38	19	
49	51	—	37	18.5	
51	53	29	36	18	
53	55	28.2	34	17	
55	57	—	30	15	
57	59	—	30	15	
59	4.01	—	29	14.5	
4.01	03	—	26	13	
03	05	—	25	12.5	
05	07	—	25	12.5	On antipyrinized saline.
07	09	—	28	14	
09	11	—	32	16	
11	13	—	37	18.5	
13	15	—	44	22	
15	17	—	35	17.5	Off antipyrinized saline.
17	19	—	34	17	
19	22	—	47	15.6	
22	24	—	29	14.5	
24	26	—	26	13	
26	28	—	25	12.5	
28	30	—	24	12	
30	32	—	24	12	
32	34	—	25	12.5	Experiment ended.

EXPERIMENT LVI.—January 7, 1886. Frog 94 grms.; curarized. Tongue observed under microscope magnifying 60 diameters. Measurements of vessels made from camera drawings, and stated in μ.

Time P. M.	Art.	Calibre of Cap.	Vein.	Remarks.
2.35	5.4	1.0	6.2	
37	5.4	1.0	6.4	
40	5.4	1.0	6.4	Injected 0.05 grm. antipyrin into lymph-sac.
42	5.2	1.0	7.0	
44	4.8	1.0	7.0	
47	5.0	1.5	7.2	
50	5.2	1.4	7.4	
53	5.2	1.4	7.4	Applied to surface of tongue solution of 1:500.
56	5.2	2.0	7.4	
4.00	5.2	2.0	8.0	
05	5.0	2.0	8.0	Applied solution of 1:100
10	5.0	2.0	8.6	
14	5.0	2.6	9.6	
19	5.4	2.6	9.8	
24	5.4	2.8	10.6	Current in veins much slowed; arteries still very active; no flow in some capillaries.
27	5.4	2.8	12.4	
30	6.0	2.8	13.2	
40	6.2	2 8	14.2	Experiment ended.

At the end of this experiment, the current in all superficial capillaries and veins was entirely arrested, due to a coagulation of the blood within their walls. There was a rich, thick plexus of the capillaries not noticed at the beginning. The deeper veins and capillaries, as also the arterioles, were still pervious, and a brisk current was running through them.

Experiment XXX. shows that it requires enormous doses of antipyrin to reduce appreciably the amount of work done by the heart of the frog, otherwise so sensitive; the rate is reduced much more quickly than the work done; the muscular structure remains unaffected, and the force of the cardiac contractions is rather intensified than diminished.

Experiment XVIII. shows that smaller doses than were used in the previous experiment increase the work done 25 per cent. and have no influence at all on the rate. Even a dose of 2 grammes of the drug passed through the heart within fifteen minutes increases the work without reducing the rate; it required 4 grammes of antipyrin to bring about an appreciable decrease in the rate and the work done. At the end of both these experiments the energy of the hearts under observation left nothing to be desired, notwithstanding the fact that their own weight of the drug had been passed through them several times during that period.

The same must be said in regard to the bloodvessels of the terrapin; for it was found that a 1 per cent. solution of the drug in Ringer's saline was required to produce dilatation of the arterioles.

Experiment LVI. shows that antipyrin, in very small doses, injected

into the lymph-sac of the frog very slightly contracts the arteries, but dilates the capillaries and veins; in large doses, applied directly to the surface of the tongue, it gives rise to extensive dilatation in the veins and also the capillaries; a 1 per cent. solution of it applied to the tongue of the frog will, after a short time, cause coagulation in all the superficial bloodvessels.

The manner in which antipyrin reduces temperature is purely by increasing heat radiation, owing to its extensively dilating the veins and capillaries; but what stamps it as an excellent antipyretic is that, besides dilating the veins, it also has a tonic influence on the heart and slightly increases arterial pressure, or at any rate does not cause a diminution of the same. It has, moreover, no injurious influence on the blood or the muscular tissues, and strengthens the auricles.

The objection to the employment of kairin and thallin as antipyretics is from the fact that they cause heart paralysis, especially affecting the auricles, in doses only slightly larger than are sufficient to produce a lowering of the temperature. But this objection becomes an absolute danger when we take into account the destructive influence upon the blood corpuscles and tissues generally.

Hydrochinon and resorcin, although not exerting the same weakening and directly paralyzing influence upon the ventricle of the heart which is peculiar to kairin and thallin, both paralyze the venous side of the heart, viz., the auricles, and greatly lower the tone of the walls of the veins. The extra amount of blood, therefore, which is driven into the veins through the increased action of the ventricle, is only with great difficulty returned to the ventricle, and here the danger is not so much from failure in the power of the ventricle as in the case of kairin and thallin, as from the danger of *bleeding the animal to death into its own veins*. The intense visceral and especially pulmonary congestion found on post-mortem, by Dujardin-Beaumetz, and others, in animals killed by resorcin, seems to confirm this view of the matter.

Antipyrin, though largely dilating the veins, increases the power of contraction of both auricles and ventricle, and has no injurious influence upon the blood nor the muscular tissues, and therefore possesses, indeed, all the good qualities of a perfect antipyretic.

LABORATORY OF THE MUSEUM OF HYGIENE,
WASHINGTON, D. C.

ON THE PATHOLOGY OF ARTERIO-CAPILLARY FIBROID KIDNEY.[1]

CARDIO-VASCULAR, SYSTEMIC, CHRONIC.

By Sir William W. Gull, Bart., M.D., F.R.S.

The subject is still but imperfectly appreciated. Whether the views contended for are in accordance with an enlightened pathology time must make evident, but this much may, perhaps, without presumption, be insisted upon, that the unity of Bright's disease is not in accordance with clinical experience. That there should be but one kind of lesion of the kidney, and but one renal pathology, needs only to be stated to be refuted. That various causes should lead on to destructive changes in the kidneys was to be anticipated, and that such changes, as they advanced, should approximate in outward character, was also to be looked for, but that this should be taken as a proof of unity of pathological cause, appears to be contrary both to sound histology and to clinical fact. The time has long come for an advancing differentiation of the states associated with albuminuria and renal lesions.

It need not be stated here that next to or even equal with the pulmonary functions, the renal functions stand foremost for the maintenance of health. If the former represents aërial respiration, the latter represents aquatic respiration. The one clears the system of gaseous, the other of solid excreta. The water function in the body is probably not yet as much considered as it deserves to be, and our practical ideas of the circulation are too much restricted to the onward current through the capillary vessels, whilst the interstitial circulation, the transit of the blood plasma and water through the textures of the organs, is too often ignored.

It is in the course of this interstitial circulation through the arteriole and capillary walls, that the first difficulty occurs which leads on to arterio-capillary fibroid changes, whether in the kidney or elsewhere. These changes are characteristic of a widespread pathology of the vascular system supervening about the middle and later periods of life.

It would be merely conjectural at present to assert that an alteration of blood plasma is the first step in this difficulty, as against its beginning in the vascular walls. The theory of the primary blood dyscrasia is maintained by those who think there is evidence that some defect in the renal function always precedes arterio-capillary fibrosis. Clinically observed, it would seem certain in many cases that the renal change is subsequent to a systemic cardio-vascular change. Neither does it in-

[1] Read at the Copenhagen Medical Congress, 1883.

validate such clinical observation to show that this condition may arise in certain cases of long-standing renal diseases in the middle and active periods of life, but certain it is that a large class of destructive renal diseases do not lead to this cardio-vascular change with hypertrophy of the heart.

The subject of the following remarks has been variously designated, according to the general aspect which the kidney presented on the post-mortem table; namely, *Bright's contracted kidney in the third stage; the granular kidney; the cirrhotic kidney; the kidney of interstitial nephritis.*

Objections might be made to each of these terms. First, as to the use of the term "Bright's kidney." Bright's investigations had no relation to one particular form of disease of the kidneys. His observations were from a clinical standpoint, and included all cases in which the urine was albuminous during life. The various forms which the kidney presented after death were no further classified by him than as "large and smooth," and "small and granular," and the intermediate condition, where the kidney was either of normal size and weight, or rather larger or rather smaller than normal, the surface being irregularly smooth, or irregularly granular. This intermediate stage of size and surface was vaguely regarded as having relations, on the one hand, to the large white kidney from which in the process of time it had contracted, and, on the other, to the small and granular form to which it was supposed to be tending, and to which it would have reached if life had lasted. In this sense, therefore, the "Bright's kidney" included every form of renal change, the whole series being characterized by albuminous urine during life. Again, the word "contracted" in the term "Bright's contracted kidney" implied, though it did not assert, a community of renal changes, first of swelling and then of contraction.

Erroneous as this theory is, and fully as the error of it has been exposed by all modern writers of authority on renal diseases, it is still very tenacious of life, and maintains itself against these attacks. The permanence of this narrow position is probably mainly due:

(1) To the habit of regarding the diseases of the kidney as of one form and nature, and further as the source and starting-point of the several lesions throughout the system associated with them; as though renal disease were always one, and had always a renal origin, and as though all the morbid changes associated with it were its effects, and had sprung from failure of the renal function.

(2) To the assumption that albumen in the urine indicates one pathology; and

(3) To the occurrence post mortem, in the several forms of renal disease, of histological changes which are more or less common to all the forms; and, hence, an erroneous inference that they are of one kind, and have an identical pathology, as though one should assert that all scars

of the skin, seeing that they have largely common histological characters, have also one pathology.

It would seem not to be sufficiently considered that, in the nature of the case, the morbid forms of histological expression are limited whatever may be their pathology; and, hence, these lines of morbid tissue change will have a tendency to approach each other as they proceed. For example, interstitial nephritis and its results in fibroid tissue and contraction, may occur in kidneys in which the morbific agencies may entirely differ amongst themselves. In catarrhal nephritis there are various degrees of interstitial nephritis, which may produce granulation of the organ, though such interstitial change and granulation may have a quite different meaning from that which occurs in the fibroid kidney which is the special subject of this communication. And the same might be said of the nephritis of scarlatina, of pregnancy, and of other forms. In fact, to repeat what has already been said, in all cases of renal lesions, there will be an approximation more or less to histological changes common to the whole.

Whilst asserting this, it is not my intention to convey the idea that the morbid anatomy of the kidney is not distinctive of the pathological condition out of which it springs; but that a full criticism of differences requires a survey of morbific cause, clinical history, and associated tissue changes in other organs, as well as of those which occur locally in the kidney; and that without this more complete survey, renal pathology may be expected to remain defective and unprogressive. The truth of this statement will be more evident, though at the same time the prejudice against accepting it will be stronger, in proportion to the limitation of our views to the final results of disease on the kidneys themselves. For, however the lesion may have begun, and from whatever cause it may have sprung, its results are destructive; and in the process of destruction they must approximate toward each other, and, therefore, contraction, granulation, and atrophy may occur in any nephritis, and the exclusively morbid anatomist will readily find on the post-mortem table a strong confirmation that there is but one nephritis, one Bright's disease; whilst, in contrast to this barren conclusion, the pathologist, surveying the life history of these cases, will probably with more approximation to truth, find that the words "Bright's disease" have no clinical significance and no value except for the satisfaction of slipshod and unprogressive therapeutists. It will seem to him, probably, that the kidney is not necessarily the centre from which all renal pathology can be studied. Without in the least minimizing the importance of renal lesions in themselves, and their reactive effects on the organism, we believe it will become more and more evident that antecedent and coincident systemic changes must be more and more studied before the pathology of nephritis is concluded.

Any other exclusive line of inquiry lays us open to the objection that we are seeking "the living among the dead," and exposes us to Goethe's satire:

> "Wer will was Lebendig erkennen und beschreiben,
> Sucht erst den Geist heraus zu treiben—
> Dann hat er die Theile in seiner Hand
> Fehlt leider! nur das geistige Band."

With these preliminary remarks, which apply *mutatis mutandis* to all pathological terms which would convey the idea that destructive changes in the kidneys have all a local origin, and constitute the chief pathological entity, I pass on to that which, as I have said, is the special subject of my communication, namely, fibrosis, or arterio-capillary fibrosis of the kidney, as it occurs at or after the middle period of life.

And here I leave, on one side, those forms of nephritis which are variously termed parenchymatous nephritis, albuminous nephritis, tubular nephritis, amyloid change, surgical kidney, scrofulous kidney, nephritis of pregnancy, and such other forms as confessedly have a more limited and local pathology.

In the year 1872, my friend, Dr. Sutton, and myself having clinically observed that cardiac hypertrophy of the left ventricle without valvular disease, and of the same character as that which goes with the contracted kidney of Bright's disease, might occur without renal change, or might precede it, set ourselves to inquire into the pathology of those cases which had hitherto been unclassified. Up to that time cardiac hypertrophy, with renal fibrosis, was explained on the theory that the blood, being imperfectly depurated by the kidney, caused a spasm, and subsequent hypertrophy of the vessels, which prevented the flow of impure blood through the organs, and called for increased power on the part of the heart to meet this difficulty.

The insufficiency of this theory became at once apparent when it was seen that the same cardiac hypertrophy might precede any sign of renal change, and might occur before there was any evidence of defective renal excretion; and to be sure of this, we were not satisfied with the ordinary examinations of the urine, but we obtained through a high authority[1] a complete analysis of such urine for twenty-four hours, which showed that there was no noticeable defect in its composition. This, therefore, as it may be called "glaring instance" of the fallacy of the old theory, suggested another source of cardiac hypertrophy outside the kidney, and this was found in the condition of the systematic arterioles and capillaries.

These were found in such cases to have undergone various changes. The intima was thickened; the adventitia thickened, and often not to

[1] Dr. Stevenson, Professor of Chemistry, Guy's Hospital.

be distinguished from the surrounding connective tissue, the smaller vessels being matted into the connective tissue by a fibroid, felt-like hyaline substance; the muscular coat was also variously altered.

Even where apparently normal, the nuclei of the muscle-cells did not absorb coloring matter so readily as in healthy vessels. This layer often seemed relatively increased, and might, in some cases, have been actually hypertrophied. But more often, even with the increased thickness, there was a morbid change in the muscle-cells; the nuclei were becoming spindle-shaped or atrophied, or reduced to small globular bodies, having a high refraction like fat.

We summarized our investigations as follows:

(1) Kidneys often much contracted; heart much hypertrophied; minute arteries and capillaries proportionately thickened by "hyaline-fibroid" formation.

(2) Kidneys little contracted, but heart much hypertrophied; minute arteries and capillaries much thickened by "hyaline-fibroid" substance.

(3) Kidneys healthy, whilst heart much hypertrophied, and minute arteries and capillaries much thickened by "hyaline-fibroid substance."

It is universally admitted that about the middle period of life vascular changes in the brain may prove fatal from hemorrhage and the like, with extreme hypertrophy of the left ventricle of the heart, and on the post-mortem table the kidneys may show but little change, often no more than early granulation with adherent capsules. Yet hitherto no one has referred the cardiac hypertrophy in these cases to defective renal function. In fact, generally, the post-mortem record has run thus: "Left ventricle much thickened, kidneys but little affected."

Two fallacies have hitherto beset an open inquiry into this form of renal pathology. The one, that where the renal changes are marked, all the attendant systemic changes have been, without reserve or limit, vaguely referred to the kidney as their source. The other, that though in a given case the systemic changes may have been of a similar character to those in the former case, yet if the kidney changes were not marked no relation was suspected between the two sets of conditions. The assumption that the fibroid change in the kidney, of the form of which I am now speaking, has a local origin, appears to us to have prevented an impartial study of all the circumstances of its origin and course and complications.

It is still widely assumed that this renal change has a more or less acute beginning in inflammation.

Now, although, obviously, the kidney at any period of life, and more commonly if the health be weakened, may become the seat of inflammation, the *fibroid change in question is not inflammatory.* There is no acute stage, no acute hyperæmia; there is no diapedesis of leucocytes and

blood cells characterizing ordinary inflammation; no local or general symptoms indicating nephritis, as a necessary part of the process.

The first abnormal departure from health as regards the kidney function may be no more than a diuresis, the urine at that time presenting no morbid character, except a somewhat lower specific gravity; there are no deposits in it of any inflammatory ecdysis, no casts, no leucocytes, no epithelium. But coincidently with this early stage, and often even preceding it, there may be for months or years marked systemic changes throughout the body, viz., loss of weight, loss of color—the complexion becoming grayish—symptoms of failing nutrition in different organs, varying in different individuals, skin less elastic, changes in brain power or spinal power, dyspepsia, shortness of breath, and signs of cardiac hypertrophy.

This train of events may go on in a vague way from month to month, without any recognized pathological basis, until albumen is found in the urine, and then, according to current views, the case is called "Bright's disease," and no further investigation seems required. Yet at this very stage, where all investigation has hitherto stopped, we believe that the Lucina of science should rather have been invoked than an Atropos to cut short inquiry. A more lucid pathology would have combined the whole facts into one state, the organism being affected throughout, at least in the vascular area. Instead of combining the thickened heart and the contracted kidney together directly, the whole man should have been placed between the two, as their proper nexus.

That this renal change is not inflammatory is now generally admitted by English pathologists. Dr. Greenfield, Professor of Pathology at Edinburgh, thinks it an atrophic process.[1]

"The primary or earliest change," he says, "is a fibroid change in the arterial walls, which especially affects the afferent arterioles" (of the Malpighian tufts). "Further," he adds, "if we carefully inquire into the history and the renal changes, we find that at least two forms of disease are grouped under this common name of renal cirrhosis, the one essentially of a chronic inflammatory nature, the other due to an atrophic process dependent on a primary arterial degeneration. It is true that we find these two forms intermingled in some cases, but in others they appear absolutely distinct. In the chronic atrophic form the primary change is a chronic periarterial and endoarterial fibrous thickening. Strictly speaking, this is not an interstitial nephritis at all, though some intercurrent inflammation may occur."

Although these quotations set forth the most recent views of one of our best pathologists in respect of the local changes in the fibroid kid-

[1] "Discussion on Albuminuria," Glasgow Pathological and Clinical Society, p. 71.

ney, I have no authority for adducing them as evidence on his part of their relation to similar systemic vascular changes in other organs, although, from our point of view, they have the most direct relation thereto.

Another, also, of our recent writers,[1] and one who contends for the unity of renal diseases, seems to imply from his writing that this fibroid change is the result of "nuclear proliferation;" a process which extends through the whole structures of the kidney, and into the tubules; an "inflammatory process, of prolonged duration, but *of minimum intensity.*" Describing the changes in the vessels, he writes: "The internal elastic lamina is swollen, its layers are separated and interspersed with nuclei; within is the much thickened endothelial layer converted into a delicate fibrous tissue, outside the elastic lamina is the muscularis, showing widely separated spindle-shaped nuclei, and looking as if it were œdematous. Outside this again, is a cellular connective tissue, in which no adventitial coat can be distinguished from the surrounding connective tissue."

Speaking of the connective tissue, he says:

"The changes in the capsule of the Malpighian bodies, the adventitial tunics of the vessels, and the basement membranes of the tubes, consist mainly in swelling and hyaline transformation."

He regards the process as of an essentially chronic nature, the changes which take place partaking more of the character of growth than of inflammation."

It may be of interest to remark that the descriptions here given by independent observers of the changes of the renal textures in renal fibrosis, are precisely of the same character, and are expressed in words almost identical with those employed by ourselves in describing associated changes in other organs.

In describing,[2] for instance, a section of the cord from the lumbar region of a man aged forty-seven, with granular contracted kidney and cardiac hypertrophy, the terms used are "vessels thickened by hyaline layers." "Thickened connective tissue, nuclei multiplied." "Arterioles much thickened, nuclei of their intima multiplied (nuclear proliferation)." "Kidney slightly granular, lungs emphysematous, heart healthy, vessels thickened by fibroid material."

Indeed, throughout the paper in which we have described fibroid changes in the vessels of the cord and their surroundings, we have been able to demonstrate *vascular changes of precisely the same character as those that occur in the fibroid kidney.*

"In the spinal cord, as in the kidney, the fibroid change is most marked where the connective tissue is most abundant, extending in cord

[1] Saundby.

[2] Pathological Transactions, vol. xxviii, 1867.

and in kidney from the adventitia of the arterioles and capillaries into surrounding connective tissue."

The fibroid material in the cord, as in the kidney, contracts and compresses surrounding tubules, causing their atrophy or destroying them; but leaving many adjacent tubules comparatively normal. In the cord, as in the kidney, it would seem that acute change frequently supervenes on the chronic.

Seeing that so many tubules remain comparatively normal, we are enabled to understand how it is that both cord and kidney may retain much of their functional activity, even when the seat of very extensive fibroid change. Of the five cases which formed the subject of this communication respecting arterio-capillary fibroid changes in the spinal cord, in two the kidneys were granular and contracted, left ventricle of the heart hypertrophied, no valvular disease. In one, kidney slightly granular, heart not hypertrophied; in two, kidneys not contracted or granular. In one of these the lungs were the seat of extensive fibroid induration; in the other, brain atrophied, great cardiac hypertrophy.

These particulars show that *fibrosis in the cord may occur coincidently with fibrosis of the kidney, or may be in advance of the fibroid change in the kidney, or may occur independently of renal disease.*

It may assist us toward a better criticism of our present position if we for a moment recall the steps which have led to it.

In Bright's time the morbid changes in the kidney, whatever their nature, so long as they were characterized by the presence of albumen during life, occupied the whole field of clinical thought. The hypertrophied heart and thickened bloodvessels were supposed to be conservative; the one for forcing the impure blood through the tissues, and the other for preventing it. The mere statement now looks almost absurd. It soon became obvious that in a very large class of renal diseases there are no such changes in the heart and bloodvessels; but, on the contrary, death occurs from an enfeebled circulation, anæmic, œdematous textures, uræmia, and exhaustion. And further, that in what was called by the older physicians the climacteric period of life, from the sixth to the ninth septenniad, the heart, the brain, the cord, the lungs, the skin, the kidneys, and other organs, become liable to degenerative changes in the lines of their arterioles and capillaries—and in the course of the *interstitial* circulation of the plasma from them, without acute beginnings in any organ, but often with acute intercurrent inflammation.

The heart, despite its liability to these degenerative changes, like other parts, still exhibits a residual force of nutrition, in the multiplication of its contractile elements (hypertrophy), as might have been anticipated from its earliest relation to the organism.

These degenerative changes falling upon the vascular areas in all parts would, no doubt, if life could be continued, extinguish the heart

itself; but in the earlier stages there is hypertrophy to meet the systemic difficulty—not, we believe, to meet the defect of the renal function, pure and simple, to push on, as it is said, the impure blood, but to meet the loss of arterio-capillary elasticity, and the hindrance to the flow of plasma through the tissues.

Whilst we can no longer, in one large class of cases, refer the arterio-capillary changes in the various organs, including the kidney itself, to the kidney as the primary seat of disease, and to the consequent uræmia, it is still a question how far a local fibroid change beginning in the kidney, and having its origin there, may lead to systemic arterio-capillary changes of the same character as those which come on idiopathically in later life.

For the present, I am content to leave this matter for future inquiry.

It is admitted that granular contracted kidney is rare in the early periods of life. It is also admitted that the kidney may be extremely atrophied by fibroid changes in it of a local kind, in young subjects, and that such changes may be fatal by unexpected uræmia without cardio-vascular change.

REPORT OF A CASE OF INTESTINAL OBSTRUCTION, SUCCESSFULLY TREATED BY LAPAROTOMY;

WITH REMARKS UPON THE TREATMENT OF ACUTE INTESTINAL OBSTRUCTION.

By Randolph Winslow, M.A., M.D.,

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That obstruction of the bowels with its attendant evils is not an infrequent occurrence, will be admitted by all who have given attention to the subject. That it is a serious and usually fatal affection cannot be denied. The term itself is used to denote a series of morbid conditions, which in many cases have only this symptom in common, whilst in other respects they are almost as widely separated as are the various conditions which give origin to the common symptom of pain.

During the past year much has been written, especially in England, about the treatment of this class of cases, and there is still a great diversity of opinion in regard to the matter. Mr. Jonathan Hutchinson decidedly opposes early interference in cases of intestinal obstruction, and thinks it of but little value in those which have been some time in existence. He advocates what he terms abdominal taxis, under an anæsthetic. By abdominal taxis, he means a thorough kneading of the abdomen, with inversion of the patient, shaking him, tossing him in a blanket, and a

variety of rough gymnastics, the object being to dislodge the bowel, or untwist the volvulus. At the same time, he uses large enemata and laxative medicines. If these means do not succeed, he waits and keeps the patient on a low diet, and gives opium or belladonna internally, and subsequently repeats the abdominal taxis. He reports a series of interesting cases in which a cure was effected by these means. He favors laparotomy as a last and most desperate resort.

Mr. Frederick Treves, and many others, take the opposite side of the question; considering the conditions which produce acute obstruction to be, for the most part, of a necessarily fatal character unless speedily relieved, they do not waste time in what they regard as useless, if not injurious, manipulations, and proceed to open the belly as soon as assured that the case is one of serious obstruction and not of obstinate constipation.

Every one concedes that an accurate differential diagnosis is in many cases impossible in the present state of our knowledge, and that it is in the highest degree important to perfect our powers of diagnosis. The opinion of so eminent a surgeon as Mr. Hutchinson must always command respect, and the report of his cases treated by abdominal taxis deserves most careful consideration; and yet I think that few practical surgeons would be willing to adopt his line of treatment. It seems to me to be a very hazardous procedure, strongly to knead the intestines and to shake and jerk a patient with a strangulated bowel about in a way that is unpleasant and painful to a well person, and that, too, in a case in which the diagnosis has not been accurately determined. It is in the highest degree probable that the patient would be injured and not benefited in a large number of cases. Suppose an internal hernia, a tight constriction of some portion of the intestinal tract, is present, and has already been in existence for days, any rough handling may cause perforation of the gut and extravasation of feces; or the prolapse may be increased instead of diminished; or the intussusception may be violently drawn out, tearing conservative adhesions; or the volvulus increased. Who would think of roughly manipulating a femoral, or any other strangulated hernia? Who would delay resorting to herniotomy, if, after very gentle taxis, fecal vomiting or other symptoms of strangulation continued? It is true that invaginated bowels sometimes are released, either by spontaneous reduction or by sloughing of the invaginated portion; volvuli are sometimes untwisted, and internal herniæ are relieved either by being reduced, or by adhesion to the abdominal walls and the formation of an artificial anus, but such methods of cure are extraordinary and are not to be expected.

Volvulus and intussusception offer the most favorable conditions for recovery, and they are attended with a very large mortality; but in the case of internal constrictions from adhesions or bands, whether from congenital defects or pathological changes, a cure by the process of

nature is of such rarity that it ought not to come into consideration, and the patient unless relieved by art is almost inevitably doomed to death. Unfortunately, it is not possible to reach a certain diagnosis in all cases, but this very difficulty is one of the strongest arguments in favor of opening the abdomen, both as a diagnostic and a curative measure. I certainly think severe pain, obstinate constipation, and stercoraceous vomit are a congeries of symptoms of sufficient gravity not only to justify, but to demand imperatively, the performance of laparotomy.

Six years ago a case of intestinal obstruction, probably from volvulus, or possibly from an impacted gall-stone, came under the care of the writer, which was relieved by medical means; the benefit lasted, however, but a short time, when symptoms of obstruction again set in, and only terminated with the life of the patient. I proposed an operation, but was overruled by the consulting surgeon. This case made a deep impression upon my mind, and I determined not to let a similar case die in my hands, without at least offering the patient the chance of relief by laparotomy or colotomy.

Another case which died from obstruction, the autopsy of which I was invited to perform, showed how slight may be the constriction which is sufficient to produce fatal strangulation of the bowel. It was that of a young child who died after an illness lasting several days, in which vomiting and insuperable obstipation were the main symptoms. The autopsy revealed an internal hernia of a portion of small intestine, which had become strangulated by passing under a small band of tissue not thicker than a few strands of horsehair. This band was attached by both ends to a portion of intestine, thus forming a free loop, through which the hernia occurred. It seemed to me to have been of congenital origin, as there was no other sign of peritonitis. The division of this band in time, would probably have saved the life of the little patient. A case presenting many similar features was successfully operated on by Mr. R. N. Pughe, of Liverpool. Several other cases are mentioned in recent journalistic literature, in which very slight bands or adhesions were the cause of strangulation.

The importance of an early recognition of intestinal obstruction cannot be overestimated, and with its recognition comes the duty of being prepared to give the patient every possible chance for recovery. These cases come when least expected, and demand prompt attention, and usually not much time is allowed the practitioner for consultation or reference. He must often act upon his own responsibility, promptly and boldly, or the golden opportunity will be lost.

Within a few weeks of each other there have occurred three cases of intestinal obstruction in the practice of gentlemen connected with the University of Maryland. One case was due to the adhesion of a loop of intestine to the pedicle of an ovarian tumor, which had been success-

fully removed some weeks previously. Another was due to the strangulation of a small portion of gut in the femoral ring, which produced no symptoms by which the seat of constriction could be located before opening the abdomen. Laparotomy was performed, the incarcerated intestine released, and the patient recovered. The other case occurred in my own practice.

It is only by accumulating facts bearing upon the results of treatment that an approximate idea can be formed of the comparative value of different therapeutical procedures, whether medicinal or operative; and, in order to contribute my mite to the elucidation of the subject under discussion, I desire to place upon record the following case:

CASE.—M. E. B., colored, aged twenty-two years, unmarried, but the mother of two children; has been generally healthy. Four years ago, according to her own account, she suffered from procidentia uteri, and, since she has had children, from "womb disease." She gives no history of having had pelvic cellulitis or peritonitis. She had suffered from constipation for several days, with pain in the abdomen, and occasional vomiting. She took purgatives—oil and salts—without effect, and sent for me on December 6, 1885.

I visited her about 10 P. M., and found her rolling over the bed in agony. Her bowels had not been moved for five days, and she had vomited twice on the day on which I saw her. The patient is slenderly built, the abdomen moderately distended and somewhat painful upon pressure. She complains of pain above the umbilicus more than anywhere else. When in a paroxysm of pain, the coils of intestines can be seen outlined upon the abdomen, and they can be felt moving under the hand. She had what appeared to be a small, reducible, inguinal hernia on the left side, which reappeared soon after being reduced. She had no pain or other symptoms of strangulation at any of the abdominal rings. There had been no fecal vomiting. I administered gr. one-third morph. hypodermatically, and ordered castor oil ℥j, oil of turpentine ʒj, a nauseous but very effective combination, to be followed by one grain of calomel every hour.

Dec. 7. The oil has had no effect, and was, some time subsequent to its administration, returned with the vomit. Six grains of calomel having been taken, it was discontinued. She had a pretty good night in consequence of the hypodermatic injection. She is in good condition, and is comparatively free from pain; pulse 80–90, temperature 98¼°. Having placed the patient in the genupectoral position, I introduced a flexible tube twelve to fifteen inches up the bowel and administered copious injections of warm water, which were returned almost unstained. Epsom salts and fluid extract of senna were ordered in small doses, which had the effect of increasing the peristalsis of the bowel with additional pain. Seeing that obstruction and not impaction of feces was present, I discontinued all medicine internally, and gave a full dose of morphia hypodermatically. Vaginal examination revealed nothing in regard to the nature of the obstruction.

8th. 10 A. M., condition unchanged, and I decided to operate. At 2 P. M. I availed myself of the opinion of my friend Prof. Michael, who coincided with me in regard to the propriety of an operation. The pa-

tient, in the interval between my visits, had vomited matter which, in appearance and odor, indicated feces. All preparation had been made during the morning for laparotomy. The belly had been well washed with soap and water, and afterward a cloth, moistened with hot bichloride of mercury solution, was laid upon it; instruments and hands disinfected with bichloride solution, and afterward kept moistened with a mildly carbolized lotion; all the water used had been boiled, and was kept in a tin boiler on a stove in the room, so that we might have an abundant supply of hot water; sponges and sutures had been in sublimate solution for months; hot boiled water, slightly carbolized, was used for the sponges and flannels during the operation. I operated in the bedroom of the patient, which was small and ill ventilated, and its appearance did not suggest a state of very rigid antisepticism. I was kindly and efficiently assisted by Drs. Michael, Chunn, and Gertrude Scott, for whose intelligent aid I am under many obligations.

This incision was in the linea alba, midway between the umbilicus and pubes and at first about two inches in length, subsequently lengthened to six inches. Bleeding was arrested before the peritoneum was opened. Coils of small intestine presented in the wound, which were reddened and distended but smooth and glistening. The abdominal rings were first explored. On the left side an apparant hernia was present which could not be reduced. External pressure caused the protrusion to bulge into the abdominal cavity, but did not expel its contents, whilst something was interposed between the ring and the finger which was mistaken for adherent intestine. As it could not be reduced from within, herniotomy was performed in the groin, and a sac was encountered, which when opened gave exit to serous fluid, but no intestine was found, and the finger could not be passed through the canal into the abdomen. This was either a cured hernia, or, as suggested by Dr. Michael, a hydrocele of the round ligament.

The obstruction not being found at any of the rings, the incision was enlarged upward to the navel. The intestines were covered with flannels wrung out of hot carbolized water. The abdominal cavity was now explored with the hand, beginning at the cæcum, but without finding any obstruction. The small intestines were now drawn out and wrapped in hot cloths; after a large portion of the small intestine had been removed from the abdominal cavity, a loop of ileum was found dipping into the pelvis, which was firmly attached between the uterus and rectum, and neither the descending nor ascending portion of the loop could be moved. The intestine appeared to be firmly and evenly attached to the pelvic wall, without any gaps or openings in which I could begin its separation; finally, loosening of the adhesions was effected, and the bowel was gradually released with the finger. After two distinct lines of adhesion had been broken up, the loop of deeply congested gut was lifted out of the pelvis, and the adhesions were found to have involved a space about six inches in length, the seat of greatest constriction having been about six or eight inches from the ileo-cæcal valve. At this point the bowel had been sharply bent upon itself, and above the bend the intestines were distended, while below it they were collapsed. In separating the gut, its peritoneal coat was torn off in several places, and its muscular coat exposed. In one place five Lembert sutures were inserted, as the intestinal wall looked weak.

The abdominal and pelvic cavities were carefully cleansed and the wounds closed. The abdominal incision was closed with five or six strong sutures passing through the entire abdominal walls, but before tying these deep sutures the peritoneum was united separately with a continuous catgut suture. A number of stitches passing through the tissues external to the peritoneum were then inserted, and subsequently the edges of the skin were secured with a continuous suture of fine silk. Iodoform powder was freely dusted on and around the incision, several thicknesses of iodoform gauze were laid over this, then eight layers of plain gauze and over all a protective. Whilst I was closing the abdominal incision Dr. Michael was kind enough to close the inguinal wound, using the continuous catgut suture, and several strands of catgut instead of a drainage tube. Iodoform in powder, gauze, mackintosh, spica bandage and bandage around the belly completed the dressings, the whole operation lasting over an hour.

During the operation the patient had unmistakable stercoraceous vomiting, and whilst handling the intestines the pulse increased in frequency. At the conclusion of the operation, her pulse was rapid but good, and the shock was not marked. She was placed in bed, bottles of hot water applied to her skin, and a small quantity of whiskey administered hypodermatically.

Whilst searching the abdominal cavity for the seat of obstruction, I made an observation which may have considerable diagnostic and prognostic value. I discovered by the sense of touch, that the mesenteric glands were markedly enlarged, hence I am led to anticipate a general tuberculosis at some future time.

At 7 P. M. reaction was found to be complete, the skin warm, the patient conscious and nearly free from pain. I drew the urine, which was normal in appearance and small in quantity.

At 10 P. M. pulse 124 in frequency and good in character, temp. 99⅘°, resp. 22. She is very comfortable and hopeful, has had no vomiting and scarcely any pain, gave ten minims Magendie's solution, hypodermatically. Allowed her to have cracked ice, and one teaspoonful of milk every hour, as she had had no food for a week. Ordered her to keep the supine position without moving. Dec. 9th, 9 A. M., patient looks well, slept well during the night, has had no vomiting, and very little pain, is very hungry, urinates freely, tongue clean, lies with the legs stretched out, and the belly is not tender upon pressure, except over the wound. Pulse 123, temp. 99⅘°, resp. 22. Milk to be given every half hour in tablespoonful doses and an equal quantity of water if she desires it. P. M., condition unchanged, has passed flatus *per anum*, pulse 128, temp. 100⅘°, resp. 20. Allowed to have two tablespoonfuls of milk every half hour, as she is ravenously hungry.

The further history is uneventful. The pulse on the second day fell to about 100 beats in the minute, and the temperature remained below 100° F. On the fourth day a large, consistent, feculent passage was voided after an enema of soapsuds. She was kept on a restricted diet of milk, with a few dry crackers, for the first week. On the ninth day the dressings were opened for the first time, and the deep sutures removed; but as the edges of the skin were not quite healed, the superficial continuous suture was allowed to remain three days longer. Not one drop of pus was seen anywhere. The wound in the groin, which was sutured

with catgut, healed firmly everywhere under one dressing, and did not require to be dressed again. She was discharged cured on December 26th.

DAILY RECORD OF VITAL PHENOMENA.

Date.	A. M.			P. M.		
	Pulse.	Temp.	Resp.	Pulse.	Temp.	Resp.
Dec. 8	....	....	....	124	99⅘°	22
" 9	123	99⅘°	22	128	100⅘	20
" 10	114	99⅖	22	97	99⅖	20
" 11	99	99⅖	22	102	99⅘	
" 12	100	99⅖	20	99	99⅕	20
" 13	102	99⅕	18	105	99⅖	18
" 14	101	99⅗	21	105	99⅕	22
" 15	103	99⅕	21	100	99⅕	21
" 16	100	99⅕	20			
" 18	104	99⅕				
" 19	....	98⅘				
" 21	90	98⅘	22			

Several facts in the above history deserve more than a mere mention. One of the most noticeable features was the absolute cessation of nausea and vomiting after the operation; from the time she vomited stercoraceous matter whilst under ether, she had neither nausea, straining, nor vomiting. Pain ceased almost as suddenly, and with the exception of a certain amount of smarting in the incision, she was entirely comfortable. Hunger was experienced almost immediately, but was not gratified. During the first twelve hours, only a teaspoonful of milk every hour was allowed, with cracked ice. After the first twenty-four hours a tablespoonful of milk every half hour, which was increased to two tablespoonfuls on the second day; subsequently three or four dry crackers were added, and after the first week a more generous diet. No medicine was given except two hypodermatic injections of morphine within the first twenty-four hours.

The escape of flatus on the second day, and of feces on the fourth, gave evidence that the constriction and paralysis of the bowel had been overcome, and that it was capable of resuming its functions. From the deeply congested appearance of the bowel, it was the opinion of those present, that she would not have lived forty-eight hours longer. Peritonitis had not, however, actually set in, as there was neither serum nor lymph found within the abdominal cavity.

The next time I have occasion to open the belly, I will modify the suture used in this case, to this extent, viz., suturing of the peritoneum will be done separately with continuous catgut; I shall then pass deep silk sutures through the abdominal walls, external to the peritoneum, as this will tend to prevent pus from finding an entrance into the cavity, should any form.

Two methods of treatment of intestinal obstruction remain to be mentioned. The first consists in washing out the stomach, and thereby producing mechanical vomiting, and emptying the intestines of gas and feces. This method is highly recommended by Kussmaul, and deserves a trial in appropriate cases, as it appears to be harmless. The other method is that so highly lauded by Illoway in the last number of this journal (Jan. 1886)—the forcible distention of the bowel with water under strong pressure. It is well known that water can be forced through the ileo-cæcal valve by simply inverting the patient, and using a Davidson's syringe. My friend, Dr. John Morris, of this city, relates a case in which, under these circumstances, water was seen to escape from the mouth in jets synchronous with the squeezing of the bulb of the syringe. I think that the degree of force just indicated is as great as should be used in administering enemata; hence I regard the injections under strong mechanical pressure as very dangerous, perhaps as much so as Mr. Hutchinson's abdominal taxis.

In conclusion, I wish to express my opinion decidedly against any and all severe methods of attempting to overcome the obstruction whether by rough manipulations, or by rectal injections under strong pressure. On the other hand, I deprecate resorting to operation until a fair trial of medical means has failed to relieve the condition, and until it is reasonably certain that there is some mechanical hindrance to the passage of the feces, which will terminate fatally unless relieved by operation. For obstruction in the large intestine colotomy would in many cases afford relief. For persistent obstruction of the small intestine, my preference is decidedly in favor of laparotomy in the linea alba below the umbilicus, under rigid antiseptic precautions, as being the most precise, scientific, and rational means of discovering the cause and seat of trouble, and of remedying it at the same time. Whilst I am not one of those who underrate the risks of laparotomy, I do not think an exploratory incision to be a more serious procedure than abdominal taxis, or enemata under heavy pressure, and I do think it much more certain and reliable in its results.

1 Mount Royal Terrace, Baltimore,
January 12, 1886.

ON RIGHT-SIDED ENDOCARDITIS.

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In the following paper I propose to record my experience with regard to the frequency of right-sided endocarditis; and, in a subsequent paper, to direct attention to the pathological features of the cases of ulcerative endocarditis which have occurred in the Edinburgh Royal Infirmary during the past three years.

Right-sided Endocarditis.

Almost all authorities are agreed in stating that right-sided endocarditis is rare. Bristowe, for example (than whom no more trustworthy or judicial observer could be quoted), says: "In the great majority of cases endocarditis is limited to the left side of the heart."[1] Sibson examined the whole of the cases of valvular and other diseases of the heart, and of Bright's disease, contained in the post-mortem records of St. Mary's Hospital, from 1851 to 1869–70, with the special object of ascertaining the frequency, extent, and character of any affection of the tricuspid valve that might occur in those cases, the result being that he could find only two cases in which the tricuspid was affected with recent endocarditis, one case in which a large concretion was attached to the tricuspid valve, and three cases in which there was distinct evidence of former endocarditis, as shown by contraction of the valvular orifice or thickening, corrugation, and roughening of the valvular segments. "These," he says, "are the only cases that permit definite evidence that in them the tricuspid valve had been previously affected with endocarditis. There were eighteen other cases in which there was some thickening of the tricuspid valve, in two of which it was stated to be atheromatous; but in none of these cases did it appear that the tricuspid valve was incompetent. Twelve of these cases had aortic, mitral, or mitral-aortic regurgitation, or mitral obstruction; and of the remaining six cases that were free from valvular disease, five had Bright's disease. "It does not appear to me," he adds, "that any of the cases present definite evidence of the previous existence of endocarditis of the tricuspid valve as the causes of the thickening of the flaps, although it is probable that in some of them the valve had been originally influenced, and especially in those that presented aortic, mitral, or mitral-aortic regurgita-

[1] The Theory and Practice of Medicine, by John Syer Bristowe, fifth edition, p. 515.

tion, or mitral obstruction. Endocarditis and structural disease of the tricuspid valve are," he states, "admitted to be so rare in the adult, that there are few clinical or pathological records describing affections of that valve."[1]

Sperling (quoted by Rosenstein[2]) found out of 300 cases of endocarditis, 297 in the left side and 32 in the right (or nearly 11 per cent.); confined to the left side alone 268, and confined to the right side alone 3, and simultaneously in both 29. . . . With a view to express the relative frequency with which the affection attacks the different valves, Sperling tabulated Virchow's material, and out of 300 cases of endocarditis he found it 255 times on the mitral, 129 on the aortic valves, 29 on the tricuspid, and 3 times on the pulmonary. In 157 cases the mitral alone was affected, in 40 the aortic valves alone, and the tricuspid alone in 3 cases, while the valves of the pulmonary artery were not the only affected parts in a single case.

Sansom's results are very different. He examined the post-mortem records of 68 cases of valvular disease at the London Hospital, and found that the stage of recent endocarditis was present in 9 cases, or about 13 per cent.; in 3 of the cases the tricuspid valve was involved; in other words, the tricuspid was involved in 33 per cent. of the cases in which evidence of recent endocarditis was present in the heart.

My own conclusions are based on an analysis of all the cases which were examined post-mortem in the Edinburgh Royal Infirmary during the three years that I held the office of pathologist to the institution.

The *total number of post-mortems* during this period, or, more precisely, from October 27, 1882, to November 16, 1885, was 685.

In this total of 685 cases the *same naked-eye lesion of the valvular apparatus of the heart* was found in 131 cases, or 19.12 per cent. This percentage does not exactly or fully represent the total amount of cardiac disease which was present in the 685 patients during life, for (*a*) in a considerable number of cases the written permission of the friends or relatives, without which no post-mortem can take place in the Edinburgh Royal Infirmary, did not include the thorax, and the condition of the heart was consequently not ascertained; and (*b*) it takes no cognizance of cases of mitral and tricuspid regurgitation due to simple dilatation and to structural changes in the cardiac muscle (relative and muscular incompetence, as I term them), conditions which are very common during life, and which may be unattended with any naked-eye lesion of the valvular apparatus after death.

The proportion in which the different valves were affected, either alone or in combination, is seen in the following table.

[1] Russell Reynolds's System of Medicine, vol. iv pp. 523, 524, and 525.

[2] Ziemssen's Cyclopædia of Medicine (American translation), vol. vi. p. 82.

TABLE I.—SHOWING THE PROPORTION IN WHICH THE DIFFERENT VALVES WERE AFFECTED IN THE 131 CASES IN WHICH THERE WAS SOME NAKED-EYE LESION OF THE VALVULAR APPARATUS OF THE HEART.

Valve.	Number of cases.	Percentage of 131 cases.
Aortic alone	17	12.97
Mitral alone	36	27.48
Tricuspid alone[1]	6	4.58
Pulmonary alone	0	0
Aortic and mitral	34	25.95
Aortic and tricuspid	1	0.76
Mitral and tricuspid	16	12.29
Aortic, mitral, and tricuspid	21	16.03
Total	131	

THE RELATIVE NUMBER OF TIMES IN WHICH THE AORTIC, MITRAL, AND TRICUSPID VALVES WERE AFFECTED.—From this statement it will be seen that the *aortic valve* was affected, either alone or in combination, in 73 cases = 55.72 per cent.; the mitral in 107 cases = 81.67 per cent.; and the *tricuspid* in 44 cases = 33.58 per cent.

THE NATURE OF THE AORTIC, MITRAL, AND TRICUSPID LESIONS.—In 34 of the 131 cases in which there was a naked-eye lesion of the valvular apparatus, the lesion was not (or was not unmistakably) the result of endocarditis. Thus, of the 73 cases in which the *aortic valve* was affected, the lesion was apparently the result of endocarditis in 59; in 12 it seemed to be due to atheroma; while in 1 case it was classed as simple (non-inflammatory) thickening; and in 1 case it consisted of a hemorrhage beneath the endocardial covering of one of the valve segments.

Of the 107 cases in which the *mitral valve* was affected, the lesion appeared to have resulted from endocarditis in 82; of the remainder, 21 have been classed as simple (non-inflammatory) thickening; 3 were due to atheroma; and in 1 case the lesion was thought to be congenital.

Of the 44 cases in which the *tricuspid valve* was affected, 25 appeared to have resulted from endocarditis; while the remaining 19 have been classed as due to simple (non-inflammatory) thickening.

It is important to note that in this mode of classification the frequency of endocarditis is certainly underestimated, for in some of the 21 mitral and 19 tricuspid cases, classed as simple (non-inflammatory) thickening, the lesion was, without doubt, the result of former endocarditis. The error cannot, however, be avoided; for, in the absence of cicatricial contraction of the valve segments and valvular orifice, I

[1] In two cases in which the tricuspid is classed as being the only valve affected, there were probably other lesions which were not noted at the time of the examination, the hearts being sent unopened to the physicians under whose care the patients had been during life.

know of no means by which the thickening of the mitral and tricuspid segments, which has resulted from former endocarditis, can be distinguished from the thickening which has resulted from long-continued forcible closure of the valve segments—such a thickening, for example, as is so frequently seen in the tricuspid segments in cases of chronic bronchitis and emphysema.

Taking the whole 131 cases, irrespective of the individual valves, the frequency of the different forms of lesion was as follows:

TABLE II.—SHOWING THE FREQUENCY OF THE DIFFERENT FORMS OF LESION IN 131 CASES IN WHICH THE VALVULAR APPARATUS WAS AFFECTED.

Simple endocarditis (recent, as evidenced by the presence of vegetation)	28[1]	
Ulcerative endocarditis	14[2]	
Simple endocarditis (old)	55	
Total (endocarditis)		— 97
Simple thickening (some the result of endocarditis)		22
Atheroma		12
Total cases		131

ANALYSIS OF THE CASES OF ENDOCARDITIS.—If we analyze the cases of endocarditis more minutely, we find:

(1) In 97 of the 131 cases, in which some naked-eye lesion of the valvular apparatus was present, the lesion was the result of endocarditis.

(2) In the 97 cases of undoubted endocarditis, the *aortic valve* was affected, either alone or in combination, in 59 cases = 60.82 per cent.; the *mitral* in 82 cases = 84.53 per cent.; and the *tricuspid* in 25 cases = 25.77 per cent.

(3) Deducting the cases of ulcerative endocarditis, which were 14 in number, and which will be separately considered afterward, there were 83 cases of simple endocarditis; in these 83 cases, the *aortic valve* was affected alone or in combination 45 times = 54.21 per cent.; the *mitral* 76 times = 91.56 per cent.; and the *tricuspid* 24 times = 28.91 per cent.

(4) In the total number of 83 cases of simple endocarditis, vegetations (or gelatinous swellings thought to be indicative of commencing endocarditis) were present in 28 cases, which have consequently been classed as recent. (In some of these cases the vegetations were evidently of some standing, and in many of them there was distinct evidence of old and chronic disease.)

[1] In some of these cases there was also evidence of chronic valve disease. I am unable to state the exact frequency with which old and recent endocarditis were combined, for in several cases the vegetations were firm and of some standing, and it was impossible in some cases of this kind to say whether the valvular thickenings and contractions which were associated with these firm vegetations, were of the same date or not.

[2] This number does not represent the total amount of old endocarditis, for in several of the cases classed as recent endocarditis (simple and ulcerative) there were also chronic valvular lesions.

In the 28 cases of recent, simple endocarditis, vegetations were found on the aortic valve 15 times = 18.07 per cent. of the total 83 cases of endocarditis, or 53.57 per cent. of the total 28 cases of recent endocarditis; on the *mitral valve* 18 times = 21.68 per cent. of the total 83 cases of simple endocarditis, or 64.28 per cent. of the 28 cases of recent, simple endocarditis (in 2 of these cases there were no vegetations, but only gelatinous swellings, thought to be indicative of commencing endocarditis); and on the *tricuspid valve* 14 times = 16.86 per cent. of the total 83 cases of simple endocarditis, or 50 per cent. of the 28 cases of recent, simple endocarditis (in 2 of these cases there was gelatinous swelling, thought to be indicative of commencing endocarditis, but no vegetations).

(5) Of the total number of 83 cases of simple endocarditis, the lesion has been classed as chronic in 55 cases; but, as I have previously remarked (see foot-note to Table II.), this does not represent the total amount of old endocarditis; for, amongst the 28 cases in which vegetations were present, and which have in consequence been classed as recent, there were several cases of chronic (old) valve disease.

In the total 83 cases of simple endocarditis, the *aortic valve* was unmistakably affected with chronic endocarditis in 30 cases = 36.14 per cent.; the *mitral* in 58 cases = 69.87 per cent.; and the *tricuspid* in 10 cases = 12.04 per cent.

(6) In the total 131 cases in which there was some naked-eye lesion of the valvular apparatus of the heart, there was evidence of recent or former pericarditis in 23 cases. In 15 of these cases there had been severe endopericarditis, the sac of the pericardium being obliterated by universal adhesions, and the valvular apparatus seriously implicated. In these 15 cases of severe endopericarditis, the *aortic valve* was affected with endocarditis in 10 cases = 66.66 per cent.; the *mitral* in 15 cases = 100 per cent.; and the *tricuspid* in 10 cases = 66.66 per cent.

Summary of the Pathological Evidence as Regards the Tricuspid Valve.—The foregoing pathological evidence may be summed up, with special reference to the implication of the tricuspid valve, as follows:

(*a*) Of 685 cases examined post-mortem, 131 presented some naked-eye lesion of the valvular apparatus of the heart; and of these 131, there were 44, or 33.58 per cent., in which the tricuspid was implicated.

(*b*) In 83 cases there was distinct evidence of old or recent endocarditis of the simple (non-ulcerative) form; and in these 83 cases, the tricuspid was affected in 24, or 28.91 per cent.

(*c*) Of the total 83 cases of simple endocarditis, there were 14, or 16.86 per cent., in which vegetations, or remains of vegetations, or gelatinous swellings thought to be indicative of commencing endocarditis, were found on the tricuspid valve, and which were consequently classed as

cases of recent (simple) endocarditis; while there were only 10, or 12.04 per cent., in which the tricuspid presented unmistakable evidences of former (old) endocarditis, as shown by cicatricial contraction of the valve segments and valvular orifice.

Further, there were 19 cases in which the segments of the tricuspid valve were simply thickened, but in which there was no cicatricial contraction; in some of these cases the thickening had probably resulted from former endocarditis.

(*d*) In 15 of the 83 cases of endocarditis, the heart had been affected with severe endopericarditis; and in these 15 cases of severe endopericarditis, the tricuspid presented evidences of endocarditis in 10 cases = 66.66 per cent.; the endocarditis being recent (as evidenced by the presence of vegetations) in 5 cases, or 33.33 per cent.; and old in 5 cases, or 33.33 per cent.

Conclusions Derived from Pathological Evidence.—My pathological experience would therefore lead me to conclude:

First, that acute inflammation of the tricuspid valve is of frequent occurrence in cases of acute simple endocarditis, and that in severe cases of endopericarditis it is usually present.

Secondly, that chronic disease of the tricuspid valve the result of endocarditis (as evidenced by the presence of cicatricial contraction of the valve segments and valvular orifice) is of much less frequent occurrence.

Thirdly, that acute inflammation of the tricuspid valve in many cases subsides and is completely cured. The importance of this fact as bearing upon the prognosis and treatment of left-sided (mitral) endocarditis will be again referred to.

Further, if this conclusion as to the curability of tricuspid endocarditis be correct, it explains the undoubted fact that in those cases of severe endopericarditis in which the patient survives the acute attack for a considerable time, the tricuspid is often found to be healthy. It is only when the patient dies soon after an attack of severe endopericarditis (before, in short, sufficient time has elapsed for the cure of the tricuspid inflammation), that vegetations or the remains of vegetations on the tricuspid valve may be expected to be found.

The Naked-eye Characters of Tricuspid Endocarditis.—It is necessary also to remember that inflammation of the tricuspid is, as a rule, much less severe than inflammation of the mitral, and that the evidences of inflammation are consequently much less distinct on the tricuspid than on the mitral valve. In this fact lies, I believe, the explanation of the discrepancy between my results and those of most other observers. In many cases, the vegetations are so small or the remains of vegetations—little, hard, glistening prominences, situated here and there on the line of contact of the auricular surface of the edge of the tricuspid valve—are so minute that they are easily missed unless care-

fully looked for; in some cases, however, the vegetations are so manifest as at once to attract attention.

Mode of Examining the Tricuspid Valve.—In examining the tricuspid valve the cone-diameter should first be ascertained; the valvular ring should then be completely cut through, the auricle and ventricle being, as it were, thrown into one; the auricular surface of the valve should next be thoroughly washed, and the line of contact on the auricular surface—the seat of election for vegetations, as I am in the habit of terming it—carefully and minutely examined.

If these directions be carefully and methodically carried out, I feel confident that the evidences of acute tricuspid endocarditis—in the form of minute vegetations or the remains of vegetations—will be much more frequently found than has hitherto been the case. I am not, of course, so rash as to say that the high percentage which was present in my series of cases will be maintained in future observations, for the number of cases at my disposal is far too small to warrant any such sweeping generalization. It is quite possible that it may be too high—that it may be accidentally high. I can, however, say that there has been no straining of evidence in the cases I have observed. In every case the examination has been made publicly, and the appearances demonstrated to large bodies of students. Some of the specimens I still retain in my possession.

The Clinical Evidence in Favor of the Occurrence of Tricuspid Endocarditis.—Turning now to the clinical side of the question, let us see what evidence there is in support of the proposition which has just been advanced on pathological grounds, viz., "that right-sided endocarditis (tricuspid endocarditis) is of frequent occurrence."

The discussion of this part of the subject is attended with difficulty, owing to the fact that physicians are not agreed as to the indications by which endocarditis may be recognized in the living subject. While all observers allow that mitral endocarditis is of frequent occurrence in rheumatic fever, there is by no means a general agreement as to the symptoms and physical signs which indicate its presence.

In my work on the *Diseases of the Heart* (p. 371, *et seq.*), I have discussed this question in great detail.

The following are the conclusions at which I arrived with regard to the value of a systolic mitral murmur as a sign of mitral endocarditis in acute rheumatism:

(1) That a systolic mitral murmur occurring in the early stages of a first attack of acute rheumatism, in a person free from previous valvular disease and not previously anæmic, shows that there is a rheumatic affection of the heart.

(2) That the mitral regurgitation may be due either to mechanical alterations in the valve segments, resulting from endocarditis, or to

muscular incompetence, the result of a rheumatic affection of the muscle of the heart, or to a combination of these two conditions.

(3) That although it is impossible in many cases to determine which of these conditions (valvulitis or muscular incompetence) is the exact cause of the regurgitation, the strong probability is that the endocardium is affected (even if the *immediate* cause of the mitral regurgitation is an acute rheumatic affection of the cardiac muscle with resulting relative or muscular incompetence). I would, therefore, regard a murmur of this description as very strong evidence of acute endocarditis.

(4) That in exceptional cases the murmur, in the early stages, is due to anæmia. In these cases there would probably be a history of well-marked anæmia; a basic systolic (pulmonary) murmur would also probably be present.

(5) That a mitral systolic murmur originating in the later stages of acute rheumatism may be due to a rheumatic inflammation of the heart (endocarditis or myocarditis), to anæmia, or to simple muscular relaxation, such as is met with in all fevers.

To these conclusions I still adhere. I would ask those who differ from them, first, to meet *seriatim* the facts and arguments which I have advanced in their support, which it would be entirely out of place to repeat here, and to give me an opportunity of meeting the facts and arguments which they think are opposed to my views; and, secondly, I would ask, if they do not admit that a systolic mitral murmur, occurring in the early stages of a first attack of acute rheumatism, in a person free from previous valvular disease and not previously anæmic, is indicative of mitral endocarditis, do they mean to affirm that mitral endocarditis is unattended by any symptoms and signs by which it can be recognized, or what are the symptoms and signs which they think indicative of its presence?

The same conclusions which have been advanced above as to the value of a mitral systolic murmur, may, I think, be arrived at in the case of a tricuspid systolic murmur as an indication of a rheumatic affection of the right heart. It is necessary, however, to point out that the relative and muscular forms of incompetence are much more easily established at the tricuspid than at the mitral orifice, and that for this reason a tricuspid systolic murmur cannot have the same value as a sign of right-sided endocarditis, as a mitral systolic murmur has of inflammation of the left heart. Still, a systolic tricuspid murmur is, I believe, the only sign by which right-sided endocarditis is, as a rule, manifested, and when it occurs in the early stages of the case, in a person who is not anæmic and whose heart was previously healthy, its value as evidence of tricuspid endocarditis is, I believe, very considerable.

Now, if this conclusion is correct, and if, as I have previously attempted to prove on pathological grounds, right-sided endocarditis is of

frequent occurrence, we ought to find a systolic tricuspid murmur frequently developed in the early stages of acute rheumatism. I regret that my own observations on this point are not sufficiently numerous to warrant any general conclusions being based upon them. For the past six years I have not enjoyed the advantage of wards in a hospital, and I have consequently been unable adequately to carry out this and the many other clinical researches which I have planned out and commenced.

Since, then, my own observations are not sufficiently numerous, I have had recourse to the observations of the late Dr. Sibson, which are the most elaborate and detailed with which I am acquainted, and which are the more valuable for my purpose, since they were made without any bias in favor of the point which I am attempting to prove.

In Table IV. in Russell Reynolds's *System of Medicine*, vol. iv. p. 462, Sibson records the form of valvular disease and the kind of murmurs which were present in 107 cases of acute rheumatism in which endocarditis was present without pericarditis. Analyzing this table I find:

(*a*) That in 13 out of the 107 cases, or 1 in 8, there was a murmur over the right ventricle from regurgitation, through the tricuspid valve, without a mitral murmur. "In nearly all of these cases there was a greater or less amount of general illness, and in one-third of these (4) there was pain in the region of the heart. A tricuspid murmur was present also in 2 cases in which endocarditis was probable, and in 2 that have been included with a little doubt among the cases of pericarditis" (p. 463).

(*b*) That "a tricuspid murmur was present over the right ventricle in one-half, or 27 in 50, of the cases with recent mitral murmur. In 7 of these 27 cases, the presence of a tricuspid murmur was somewhat doubtful" (p. 463).

(*c*) A tricuspid murmur was present over the right ventricle in one-half, or 5 in 10, of the cases with a recent diastolic murmur (see p. 494).

(*d*) A tricuspid murmur was present in 2 or 3 of the 9 cases of combined aortic and mitral murmur of recent origin; and (*e*) in 5 of the 22 cases in which endocarditis was superadded to old valvular disease.

A tricuspid murmur was therefore present in 51 or 52 of the 107 cases of acute endocarditis recorded in this table, or in 47 or 48 per cent.

Further, it will be seen by reference to the more detailed account which Sibson afterward gives of these cases, that in a large proportion of them the tricuspid murmur was developed at an early stage of the disease, even before the mitral or aortic murmurs with which it was generally associated. "The tricuspid murmur," he says, "was present at the time of admission, or on the second day, in two-thirds of the cases (19 in 27) in which there were both a tricuspid and a mitral murmur" (p. 466).

Now what is the value of this murmur as an indication of right-sided (tricuspid) endocarditis? Sibson, who, be it remembered, is a very strong supporter of the view that a mitral systolic murmur occurring in the early stages of acute rheumatism is indicative of endocarditis of the left heart and mitral valve, concludes that a tricuspid murmur is not a sign of inflammation of the right side of the heart and of the tricuspid valve, but of inflammation of the left side of the heart and of the mitral valve. "When," he says, "the left ventricle is weakened by that inflammation, it sends less blood into the vessels of the system, and an undue amount of blood, therefore, accumulates in the vessels of the lungs—the pulmonary artery is overfilled, and the left ventricle is distended. The 'safety valve' function of the tricuspid is then brought into play, regurgitation takes place, and, by throwing a portion of the blood backward upon the veins of the system, it lessens the pressure of the blood upon the arteries of the lungs. . . . Tricuspid regurgitation, then, while it declares the presence of inflammation of the left ventricle and the mitral valve, relieves the congestion of the lungs, which is one of the worst effects of that inflammation. . . . A tricuspid murmur, then, is a friendly sign; it warns you of inflammation elsewhere, and relieves the ill effects of that inflammation. It is a danger signal and a brake, lessening the mischief" (p. 490).

With this opinion, which has been very largely accepted and quoted, I cannot altogether agree. Let us look at the facts and arguments with which Sibson supports it, and the facts and arguments which can be advanced against it.

Sibson says:

"The presence of this murmur in these cases over the right ventricle in the early stages of endocarditis, and that, too, when no other murmur prevails, naturally suggests to the mind at first sight that it is due to endocarditis affecting the right ventricle and the tricuspid valve. This inference is, however, forbidden by the following considerations:

(1) "*Endocarditis, and disease the result of endocarditis of the tricuspid valve, are very rarely discovered on dissection in those who have died from rheumatic inflammation of the interior of the heart or from valvular disease the effect of such inflammation.*"

Against this I advance the pathological evidence brought forward at the beginning of this paper; and say that, if that evidence is correct, this argument necessarily falls to the ground.

(2) "*The tricuspid murmur, when uncomplicated with disease of the mitral valve, was not established in any of my cases, but had either ceased altogether, or was steadily declining on the recovery of the patient.*"

This argument only shows that the pathological condition which is the cause of the tricuspid murmur usually passes off and does not result in the production of organic disease. But this is exactly what I claim usually happens in cases of right-sided endocarditis. Even in severe

cases of endopericarditis, the tricuspid inflammation is, as a rule, slight, and seldom leads to much permanent alteration of the valvular orifice. When, then, the tricuspid inflammation (as evidenced by the tricuspid systolic murmur, if that is an evidence of endocarditis) is unaccompanied by disease of the mitral valve (as evidenced by the presence of a mitral systolic murmur),[1] I would expect it to be still less severe, and I would expect it "to pass off, and the murmur indicative of it to have ceased altogether, or to be steadily declining on the recovery of the patient."

In short, this argument is of no value unless you grant—and this I am not prepared to do—that endocarditis of the tricuspid must in a large proportion of cases necessarily terminate in the production of permanent organic disease.

(3) "*The tricuspid murmur was frequently associated with a mitral murmur, and less often with a mitral-aortic or an aortic murmur of recent origin*"

This again seems to me to be no argument against the tricuspid murmur being indicative of tricuspid endocarditis; in fact, it is just what my pathological experience would lead me to expect, for I have almost invariably found tricuspid inflammation associated with endocarditis in the left heart.

(4) "*I have observed,*" he says, "*tricuspid regurgitation as a marked and lasting feature in a case of buttonhole contraction of the mitral valve; in several instances in which the tissue of the lung was permanently condensed, owing to repeated attacks of bronchitis; in patients affected with contracted granular kidney, in whom obstruction of the pulmonary circulation with enlargement of the right ventricle had followed upon obstruction of the systemic circulation, with its attendant tension, dilatation, and thickening of the systemic arteries, and hypertrophy of the left ventricle.*"

With the facts contained in the above statement, I, of course, entirely agree. I fully admit that obstruction to the flow of blood through the left heart or through the lungs is a common—I would say, by far the most common—cause of tricuspid regurgitation; but I do not agree with Sibson's further conclusion that "these circumstances (Arguments 1, 2, 3, and 4) point irresistibly to the conclusion that the tricuspid regurgitation [in the early stage of acute rheumation, B. B.] is usually due to the so-called 'safety valve' function of that valve, and not to endocarditis of the right heart." Nor can I admit that inflammation of the left side of the heart, even when there is no regurgitation through the mitral orifice, impedes the flow of blood from the lungs into that side of the heart, and that the accumulation of the blood in the pulmonary vessels, thus caused, induces and is relieved by this tricuspid regurgitation. I see no reason for supposing that the obstruction to the flow of blood through the left heart is sufficiently great in the early stages of left-sided endocarditis to produce tricuspid regurgitation. It seems to

[1] Sibson is considering those cases in which a tricuspid murmur was alone present. The same arguments, of course, hold with regard to those cases in which mitral murmurs were present.

me much more probable that the tricuspid leakage is due to a rheumatic affection of the right heart (either a rheumatic affection of the muscular wall of the right ventricle with resulting relative, or muscular incompetence, or a rheumatic endocarditis, involving the tricuspid valves, or both), just as mitral regurgitation under such circumstances is, in my opinion, due to a rheumatic affection of the left heart.

This conclusion is, I think, supported by the intrinsic evidence afforded by a close examination of Sibson's cases.

(*A*) Take, for example, the date of the appearance of the tricuspid murmur and the length of time it continued in the 27 cases in which it was associated with a mitral murmur.

"In 7 of the 27 cases, the presence of a tricuspid murmur was somewhat doubtful. *In 8 of these cases the mitral was preceded by the tricuspid murmur, and in 6 of these the tricuspid murmur had ceased to be audible when the mitral came into play.*[1] In 13 other cases both murmurs were present when they were first noticed, which was at the time of admission, in fully one-half of *those patients. The tricuspid murmur disappeared when the mitral murmur was audible in two-thirds of the cases* (16 *in* 27);[2] both murmurs ceased at the same time in 7 instances; and in 4 the tricuspid murmur outlived the mitral."

Now if the tricuspid murmur had been produced, as Sibson supposed, by the left-sided endocarditis and the resulting obstruction to the blood flow through the left heart, it would surely have been most marked when the mitral regurgitation was at its height, for the obstruction would then necessarily have been greatest; and if this were so, it is natural to suppose: *first*, that the tricuspid murmur would have appeared after the mitral murmur and not before it, but this was not usually the case; and, *secondly*, that it would have remained as long as the mitral murmur remained, whereas it disappeared when the mitral murmur was still present in two-thirds of the cases.

(*B*) Further, it will, I suppose, be admitted, that when a combined condition of aortic and mitral regurgitation is produced by endocarditis, the backward pressure is usually greater than when mitral regurgitation is alone present. If this is so, and if the tricuspid regurgitation is produced, as Sibson supposed, by obstruction in front, a tricuspid murmur ought to have been more frequently present in combined cases of aortic and mitral endocarditis than in mitral endocarditis alone. But this was not the case, for a tricuspid murmur was only present in 2 or 3 of the 8 cases of mitral-aortic regurgitation; whereas, it was present in 27 out of 50 of the cases of mitral regurgitation.

For the same reason, a tricuspid murmur ought to have been more frequently present in combined cases of mitral-aortic regurgitation than in cases of aortic regurgitation alone, since the backward pressure is usually much greater in the former than in the latter; but this was not

[1] No italics in the original. [2] No italics in the original.

so, for a tricuspid murmur was present in about 4 (or, as is stated a little later on, p. 494) in 5 of the 10 cases of aortic regurgitation of recent origin, but only in 2 or 3 of the 8 cases of mitral-aortic regurgitation.

(*C*) Further, it will, I suppose, be generally allowed that when endocarditis attacks a heart which is already crippled with mitral, aortic, or mitral-aortic disease, the embarrassment of the pulmonary circulation is, as a rule, much greater than when a heart which was previously healthy is attacked. If, then, Sibson's view is correct, a tricuspid murmur ought to be more frequently developed when endocarditis is superadded to an already existing valvular disease, than when the heart is previously healthy. But this was not so. In the 22 cases in which there was previous valvular disease, a tricuspid murmur is said to have been present 5 times. Sibson adds (p. 464): "A tricuspid murmur was present in none of the seven instances with mitral-aortic valvular disease affected with endocarditis."

Such are my reasons for disagreeing with Sibson's explanation and for concluding that the tricuspid murmur occurring in the early stages of acute rheumatism is usually *due to a rheumatic affection of the right heart.*

Before leaving Sibson's statistics it should be stated that in 46 cases of recent endopericarditis which he summarizes in Table 3 (p. 462), a tricuspid murmur was only observed in 3. Now, in my experience, endopericarditis usually represents a more severe rheumatic affection of the heart than endocarditis alone; and my pathological observations clearly show that right-sided endocarditis occurs more frequently (or, to be strictly correct, is observed post-mortem more frequently) in cases of endopericarditis than in cases of endocarditis without pericarditis. I should, therefore, have expected a tricuspid murmur to have been present in a much larger proportion of cases of endopericarditis than Sibson's table shows.

The absence of a tricuspid murmur in some of these cases can, perhaps, be explained by supposing that the friction sounds which are usually heard over the right heart obscured the tricuspid murmur, which is always soft and faint in character, and often flitting and temporary in its continuance. But be that as it may, the comparative rarity of a tricuspid murmur in Sibson's cases of endopericarditis cannot be advanced as an argument in favor of (in fact, it is rather, I think, an argument against) his view; for it must, I think, be allowed that the obstruction to the passage of the blood through the left heart is, as a rule, greater in cases of endopericarditis than in cases of endocarditis alone; and if this is so, and if Sibson's theory is correct, the tricuspid murmur ought to be more frequently present in cases of endopericarditis, than in cases of endocarditis alone.

The final conclusions which I would draw from this investigation are:

(1) That my pathological experience leads me to believe that right-

sided endocarditis is much more frequent than is usually supposed; and that this conclusion is in no way contradicted, but on the contrary rather confirmed, by clinical evidence and clinical facts.

(2) That Sibson's arguments against the tricuspid murmur of early acute rheumatism being indicative of right-sided endocarditis, are not valid.

(3) That, in my opinion, a tricuspid murmur occurring in the early stages of acute rheumatism in a previously healthy person who is not anæmic, is indicative of a rheumatic affection of the right heart.

(4) That whether (*a*) the tricuspid regurgitation is the *direct* result of the inflammation of the tricuspid valve, or whether (*b*) it is due to a rheumatic affection of the wall of the right ventricle, with resulting relative or muscular incompetence, the pathological evidence seems to show that when the right heart is so affected in acute rheumatism as to produce a tricuspid leakage, inflammation of the endocardium of the right heart is often (usually?) present.

(5) That although right-sided endocarditis is of frequent occurrence, it is comparatively seldom followed by permanent organic disease of the tricuspid valve; in short, that right-sided endocarditis is an eminently curable affection.

The importance of this conclusion, if it be correct, can hardly be overestimated. It is not a conclusion of mere scientific and pathological interest, but is of the greatest practical and therapeutical value. It strongly supports the other arguments which I have advanced in my work on the *Diseases of the Heart* to show that mitral endocarditis is also a curable affection, a view which is by no means accepted by many of our very best and most trustworthy authorities. Thus Bristowe says "the prognosis of endocarditis is very serious. It is rare, indeed, for perfect recovery to take place."[1]

Further, it shows, I think, the immense importance of rest in the treatment of endocarditis. The only reasonable explanation of the fact that mitral endocarditis is more severe and more frequently terminates in permanent valvular disease than tricuspid endocarditis, seems to me to be that the closure of the mitral segments is more forcible and that the inflamed mitral segments are subjected to greater strain than the tricuspid segments. In treating cases of mitral endocarditis our main object should be to imitate nature's method of cure; to place the mitral valve, so far as we are able to do so, in the same condition as the tricuspid valve; in other words, to reduce the force (and also the frequency) of the cardiac contractions and to allow the products of inflammation to be absorbed just as they are usually absorbed on the right side of the heart.

[1] The Theory and Practice of Medicine, fifth edition, p. 518.

REPORT OF A CASE OF INSANITY FOLLOWING GUNSHOT INJURY TO THE HEAD;

CEREBRAL CYST; ASPIRATION; RECOVERY.[1]

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Having consulted such files of leading journals and standard works on mental and nervous diseases, surgery, etc., as were readily accessible, without finding a case closely resembling the one described in the following pages, I do not feel wholly unwarranted in soliciting your indulgent attention to a brief recital of the clinical history of a case, which, to me, is in some respects unique, and which would seem to warrant recording on account of its intrinsic interest, and, also, as a clinical contribution to the study of the localization of brain functions, a subject, the accurate determination of which is now engaging the earnest attention of distinguished investigators at home and abroad.

Case.—Darwin Dingman, convict, aged twenty-seven years, native of New York State, married, a farmer by occupation, and of intemperate habits, was admitted to the State Asylum for Insane Criminals, from the New York State Reformatory, on June 6, 1885, upon the certificate of Dr. H. D. Wey, physician to the Reformatory. The commitment stated that Dingman was convicted in Delaware County, of assault in the first degree, and sentenced, on February 27, 1883, to the State Reformatory for a maximum term of ten years; that on a former occasion he had been confined in jail at Cooperstown, for sixty days, on a charge of intoxication; that he was addicted to both liquor and tobacco; that he had been employed in prison as a general laborer and stonecutter; that his present bodily condition was good; that he had a depression of the external table of the frontal bone said to have been caused by a pistol ball three or four years ago; that, so far as known, he had not been insane before conviction; that his heredity was not known; that at the time of his conviction he was a "crank," but not regarded as insane; that he was probably addicted to self-abuse; that his habits as to sleep and food were irregular; that he had been confined in a cell since the present outbreak of violence began, four days previously; that the form of his insanity was chronic mania, and the cause, possibly a bullet wound in the frontal region. Dr. Wey further stated that he based his opinion as to the patient's insanity upon the following grounds: "that on the morning of June 2d he was discovered in an excited state, pulse quickened, skin dry, tongue pasty and covered by a whitish fur; he refused to answer questions, stared sullenly at those who approached him, and occasionally muttered 'Go away and don't tantalize me.' He resisted being examined, and it was necessary to use force to bring him out of his cell and place him where he could be observed. For the last four days he has been under my observation, and during that time he has refused to answer

[1] Read at the annual meeting of the New York State Medical Association, November 17, 1885.

questions or communicate in any way. He has been emotional, and upon being talked to or chided will lose self-control and cry. His manner and actions would indicate he is suffering from a delusion which he has thus far concealed.

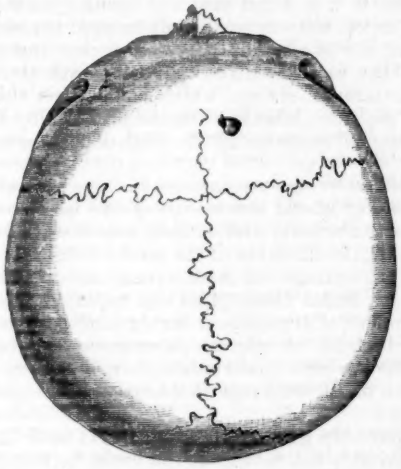
"For a number of weeks past his cell-mate has noticed that he has surrounded all his actions with an air of mystery and that he has been irritable and uncertain in his temper. At work he has been quick to fly into a passion, resenting with sullenness and displeasure any directions given him as to how to perform his work. Ever since his admission to the Reformatory, in March, 1883, he has, at intervals of two or three months or longer, been subject to attacks of irritability which were regarded as outbursts of an ungoverned temper rather than as proceeding from mental disease and organic brain trouble the result of the former injury to his head, the mark of which is to be found in the frontal region beneath the hair.

"Recalling his actions and manners in the past, and connecting them with his present condition, I am inclined to believe there has been mental disturbance, varying at times in intensity, for several weeks past or even for months."

On admission to the asylum, about 11 A. M., the patient was in a state of violent maniacal excitement, with marked bodily agitation, so much so that it was impossible satisfactorily to make the usual physical examination of the chest organs. When spoken to he would not reply, but would shake his head violently, strike the top of his head with his hands, and thrusting his fingers into his hair would frantically pull it as if to relieve himself from the great distress which he evidently suffered. He was immediately sent to the ward, given a warm bath, placed in bed, and kept under special observation for the purpose of determining his exact condition uninfluenced by drugs. At noon he refused food, the sight of it seeming to excite an exacerbation of the violence, as also did any attempt to examine his head; his face presented a livid, dusky hue, and his hands were cold and clammy; pulse 116, and quite feeble; temperature 100°; respiration 40; pupils dilated: tongue milky in appearance, broad, flabby, and edges indented by teeth; so far as could be determined by careful examination, there was no paralysis, anæsthesia, or disturbance of the special senses.

An examination of the head revealed a nearly circular depression of the skull about half an inch in diameter and about a fourth of an inch deep at the centre, and corresponding to which, in the scalp, was the point of crossing of a crucial scar. The skull lesion was located, as nearly as could be determined by external measurement, over the right first frontal gyrus at a point corresponding to the junction of its anterior and middle third, being about one and three-eighths inches from the margin of the hairy scalp and about three-eighths of an inch to the right of the median line. The least pressure upon the point of depression seemed to produce intense pain and would throw him into violent bodily agitation. During the afternoon he remained substantially in the same condition as above described; at 6 P. M. he again refused solid food, but took, voluntarily, a pint of eggnog containing mag. sulph. half an oz., and potass. bromid. grains 40. He continued restless and sleepless throughout the night, drinking water with avidity several times; also had one movement of the bowels, and passed a moderate amount of urine, which had a specific gravity of 1.035, but contained neither casts,

albumen, nor sugar; on the following morning he seemed worse, shaking his head and striking it violently with his hands or upon the floor, and wildly clutching his hair with his fingers, requiring the constant presence of an attendant to prevent him inflicting self-injury. About 7 A. M.



Depression three-eighths inch from the median line and one and three-eighths inches from the edge of the hairy scalp.

he drank a cup of coffee and some water, but refused to eat or speak and frequently smacked his lips and moaned. His pupils were dilated, and his eyeballs presented a staring appearance; pulse 104, temperature 99½°, respiration 40. At 11 A. M. he was given, subcutaneously, twelve minims of Magendie's solution of morphia, which partly calmed him for about one hour, when his symptoms returned with increased violence.

From the nature of the symptoms, and in the then absence of information as to the removal of the bullet, I was of the opinion that the seat of the mischief was in the immediate region of the skull lesion, and that the trephine would probably reveal the existence of either the bullet itself, a spicula of bone, or an abscess, or possibly the latter in association with either of the two former. This opinion was concurred in by Dr. W. S. Cheesman, of Auburn, who was present by invitation, and my assistant, Dr. Wells, who performed the operation; all agreeing not only as to the propriety of the operation, but that such a procedure was demanded, in accordance with the sound surgical doctrine laid down in the following language by a recent writer on injuries to the head:[1] "The later forms of compression of the brain by lymph and pus, are peculiarly grave, and unless remediable by the surgeon's giving them free vent, and too often then, they sooner or later destroy the patient." Ac-

[1] Charles B. Nancrede, M.D., "Injuries of the Head," Ashhurst's Encyclopædia of Surgery, vol. v, p. 66.

cordingly it was decided to make an exploratory operation, by cutting down upon and laying bare the skull at the point of depression, to ascertain its condition, and, if necessary, trephine it.

At 3 P. M., the patient having been etherized, the skull was exposed by a crucial incision through the scalp at the point indicated; on dissecting back the flaps, which were firmly bound down to the bone by cicatricial tissue, it was found that the opening in the skull was not closed by bony union, but was completely bridged across by dense fibrous tissue. Finding the skull thus pervious, it was thought best, before using the trephine, to explore the region beneath the dura mater, by means of a hypodermatic syringe, which should serve the double purpose of a probe and aspirator, after the manner proposed by Drs. Fenger and Lee,[1] "as a means of ascertaining the seat of abscess through the trephine opening."

The needle of the syringe was inserted in three several directions, care being taken to avoid lateral movements of the instrument, each time to the depth of about one inch, with entirely negative result; on the fourth insertion, however, the direction of the needle being downward, forward, and outward, the syringe, on withdrawing the piston, was instantly filled with a clear, serous fluid. This was repeated several times until nearly two drachms of transparent serum had been removed, and no more could be obtained. A microscopic examination of the serum, made while the patient was still under ether, showed nothing but a few fresh blood corpuscles, which were regarded as extraneous, and, consequently, of no significance.

Desiring to limit the gravity of the operation to the minimum, it was now deemed advisable not to expose the brain by trephining, but to let the patient emerge from the effect of the anæsthetic, and to note whether or not the tapping had afforded him any relief. The wound was accordingly closed by horsehair sutures, and dressed antiseptically. As soon as the effect of the ether had passed off, the patient began to converse, and, to our surprise and gratification, in a perfectly rational manner. He said that he felt well and expressed great gratitude at finding himself free from the pain in his head, which he said he had suffered almost constantly for upward of two years. On being offered a dose of whiskey, which he recognized by the odor, he said he would rather not take it, unless it was deemed absolutely necessary, as whiskey had been the cause of all his trouble.

At 6 P. M., less than three hours after the operation, he gave a lucid and detailed history of the circumstances attending his injury and subsequent condition; the essential points of which are as follows: Says that he has always been healthy, and that there is no insanity in his family; that on January 26, 1883, after having drank to excess, he quarrelled with his wife and attempted to shoot her; failing in which, he, with suicidal intent, shot himself in the head, inflicting the injury above described; the weapon being a small pistol, the calibre of which he did not know. The shot rendered him unconscious for a time, the duration of which he was unable to state. On regaining his senses he found himself in the county jail, to which he probably had been committed to await the result of his injury.

He learned, at the jail, that Dr. George F. Entler, of Oneonta, had

[1] "Abscess Cavities in the Brain," AMERICAN JOURNAL OF THE MEDICAL SCIENCES for July, 1884.

attended him at the time of the injury, but failed to learn whether the bullet had been removed.[1]

Dingman was subsequently indicted for assault in the first degree, tried, convicted, and sentenced to the State Reformatory, as has been mentioned. He says that he was comparatively free from head symptoms during the first six months of his stay at the Reformatory,[2] then he began to suffer from frequently recurring frontal headache, the pain being at times almost unbearable. He also became very irritable and emotional, slept badly, and experienced much difficulty in pursuing his studies, the least mental effort seeming greatly to aggravate his head symptoms.

He went on in this way until about June 1, 1885, at which time he was assisting in laying tile at the Reformatory, which is the last thing he remembers prior to finding himself in the asylum after the operation.

As soon as the patient had fully recovered from the effects of the ether he was given some milk-punch, and at 9 P. M. received thirty grains of chloral, which caused him to sleep well during the remainder of the night.

June 8. Is quite rational, says he feels well, with the exception of a slight pain in the head. Took, with apparent relish, his breakfast, consisting of toast, eggs, milk, and coffee. Morning: pulse 84, temperature 99½°, respiration 28; slept more or less during the night. In the evening complained of slight pain in the frontal region, and asked to have the bandage loosened a little, which was done. Pulse 90, temperature 99°, respiration 26.

9th. Slept well last night; awoke refreshed and entirely free from pain. Pulse 92, temperature 99⅕°, respiration 32. Slightly delirious in the evening; pupils moderately dilated. Evening: pulse 88, temperature 99°, respiration 40. Was given twenty grains of chloral hydrate at 10 P. M., after which he fell asleep.

10th. Rested well during the night and awoke refreshed, cheerful, and quite free from pain; pulse 84, temperature 98⅘°, respiration 26. Evening: pulse 80, temperature 99½°, respiration 28; gratefully refers to freedom from pain. Was again given twenty grains of chloral, which produced sleep.

11th. Passed a good night, says he feels well and is free from pain. Pulse, temperature, and respiration normal.

[1] At the time of the operation the writer did not know whether the bullet, or any portion of the skull, had been removed. Dr. Entler writes me, under date of July 14th, as follows: "Darwin Dingman received an injury (he will give you the date) by a pistol-shot fired by himself. The ball entered the soft parts near the anterior border of the first convolution (right side); being unable to find the ball by the aid of a probe, I thrust a grooved director under the skin as far as it would go and cut to the point of the instrument (about an inch) here, at the point at which you found the cyst, the ball was found between the two bony tables of the skull; after cutting away a small portion of the bone the ball was with difficulty removed. By the aid of a probe was able to explore the hole thus left, but I did not find any fracture of the inner table, or 'marked depression.' The same day he was removed to Delhi, the county seat, and I did not see him after. The case is certainly a singular one, and I would be glad to hear more of it. The ball I am unable to find, although I had the same for a long time in my office. Will send it you should I ever find it."

[2] The following copy, kindly furnished me by Dr. Wey, of an entry made in the Reformatory Biographical Register, on March 11, 1883, five days after Dingman's admission to that institution, would seem to throw some doubt upon the accuracy of this statement: "D. Dingman, when coming through the hall to-day, was flourishing and gesticulating with his hands in a very excited manner; being locked up in his room, he walked up and down, repeatedly saying, 'Yes, I killed her, G—d d—n her, I intended to kill her.'"

13th. Continues the same. The dressings were removed to-day, also the sutures; the scalp wound has healed by primary union; patient eats and sleeps well; says he "never felt better in his life."

26th. Since last record the patient has been up and about the ward daily, and is doing well in every way.

July 7. Continues well. Was to-day detailed as table waiter, at his own request.

September 29. Patient is now in robust health, having increased forty-five pounds in weight since his admission to the asylum. With the exception of a mild evanescent delirium on the evening of June 9th, he has been continuously free from mental disturbance since the operation was done. He was to-day transferred to the Reformatory, as recovered.

November 9. A letter received from Dr. Wey, under date of November 8th, contains the following: "I saw Dingman this morning and examined him carefully. He is now in as good health as at the time of his return. He tells me he has no more headache, eats and sleeps well, and feels in every way better than he has in three years. I have had him excused from all school work, and trust that by thus relieving the pressure upon him he may make such a record as will gain him a speedy release."

The points to which I would call particular attention in the report of this case are the following:

1. A lesion located anteriorly to that portion of the first frontal gyrus included in the centre marked 12, by Ferrier, and which is now regarded as the anterior boundary of the motor area giving rise to psychic derangement, and unaccompanied by motor or sensory disturbance, furnishes affirmative evidence, both positive and negative, of the correctness of the view held by a majority of modern neuro-physiologists, namely, that the motor and sensory areas of the cerebral cortex are not located in that portion of the brain lying anterior to the coronal suture, and aptly designated by Ferrier "the præfrontal lobes or antero-frontal region."[1]

2. That when not in a state of inflammation, the brain substance may be punctured with a fine, clean needle, with comparative immunity from danger or disturbance of function.

3. The certainty that recovery in Dingman's case was directly due to the operation.

4. Cases of insanity dependent upon injury to the head, and accompanied, as they usually are, by mental irritability and explosions of temper, are, as a rule, so seldom benefited by drugs or the so-called moral treatment, that they have come to be regarded as incurable from the beginning; in fact, I believe it is the custom of most writers upon insanity to speak unfavorably regarding the prognosis in these cases. That the prognosis is bad in a considerable proportion of cases of traumatic insanity must, I think, be conceded, but it is equally true that a certain limited

[1] The Localization of Cerebral Disease, Ferrier, Fig. 27, page 59.

number may be cured, or, at least, greatly improved by timely surgical interference. Obviously, the cases which are most likely to be benefited by operative procedure are those of which the one just reported is a type —that is, cases with depression of the skull, in which the location of the brain lesion can be determined with a reasonable degree of accuracy, the site of the lesion being such as to render the use of the trephine anatomically admissible.

By reason of the numerous and valuable contributions which have recently been made to our knowledge of neuro-physiology and the localization of cerebral disease, the practice of trephining for the relief of epilepsy resulting from injury to the head has been revived, and may now be said to have become quite fashionable, if one may judge from the frequency of cases reported in the journals of the day; such being the case, it would seem to be not unreasonable to maintain that the arguments advanced in favor of the operation for epilepsy, would apply with even greater force to cases of lunacy depending upon similar causes.

As long ago as 1848, Dr. C. Lockhart Robertson, then physician to the Military Asylum at Yarmouth, England, ably advocated trephining for the relief of insanity with depression of the skull, the result of injury to the head. He reports a case of ten years' standing which was cured by the operation.[1] He, also, in the same article, cites two other cases as having been permanently cured in this way.

Dr. G. Mackenzie Bacon, Superintendent of the Cambridge Asylum, England, has recently reported a case of complete recovery following trephining of the skull in the case of a lunatic, nineteen months after the reception of a blow upon the head.[2]

These successful cases, together with that of my own, are suggestive, not only to those who are especially engaged in treating the insane, but to the general practitioner as well, into whose hands insane patients usually come in the early and most important stage of their malady, and upon whose judgment and advice, as the family physician, the friends of patients are wont to rely.

5. That simple cysts in the brain substance are exceedingly rare.

Ross, in his valuable work on *Diseases of the Nervous System*, page 557, says: "Cystic growths in the brain are not as common as was formerly supposed." Bastian, in speaking of the morbid anatomy of adventitious products in the brain, affirms that "it seems extremely doubtful whether simple, serous cysts are ever met with in the substance of the unaltered brain tissue;" and again, "It is true that larger cysts are not unfrequently met with in the brain; but these, when not due to one of the two forms of cystic entozoa to be hereafter described, should rather

[1] "On the Application of the Trephine to the Treatment of Insanity, the result of Injury to the Head," Winslow's Psychol. Journal, January, 1848.

[2] Journal of Mental Science, January, 1881.

be termed pseudo-cysts, since they are not primary formations, but have resulted from the modification of preëxisting states."[1]

Dr. E. C. Seguin, reported to the American Neurological Association, in 1885, a case in which at the autopsy there had been found a cyst of the superior portion of the vermis extending into the right cerebellar lobe.

In the *Tansactions of the Clinical Society of London*, vol. vi., Dr. J. Lockhart Clarke reports a case of cysts of the cerebellum following a wound received in early life; but Dr. Clarke was not satisfied that the cysts could be attributed to the injury. He also gives, coincidently, the history of the patient's mother, who had cerebral symptoms apparently dependent upon an accident, and who had a cyst in the central white substance of the cerebellum on each side. Dr. Sharkey reported to the London Pathological Society, June 17, 1881, a case of cerebellar cyst following an injury to the back of the head. The cyst "was not a hydatid, and had no inflammatory thickening of the cerebellar substance around it, nor were there any hæmatoidin crystals or other remains of effused blood." He concludes, "simple cysts of the brain are rare, and their pathology obscure."

In the *Revue de Chirurgie*, July 10, 1883, a French surgeon[2] reports a case of epilepsy with hemiplegia, following injury to the head two years previously. The intellect becoming clouded, it was decided to trephine, the instrument being applied to the right side over the Rolandic fissure. "As the operation proceeded, a crack was seen in the skull, and in the arachnoid was found a little cyst the size of a pea. This was removed, and the surface of the brain was scraped where it seemed to have undergone some alterations. The epilepsy and hemiplegia disappeared at once, and had not returned at the time of the report, a month after the operation."

An examination of the histories of ninety-nine American cases of brain disease, which are collected, classified, and critically analyzed by Dr. M. Allen Starr, of this city, in his recent valuable contribution to the study of the functions of the cerebral cortex,[3] reveals no case of simple, uncomplicated serous cyst.

Finally, inasmuch as the brain was not exposed, and the fortunate termination of Dingman's case precluded an autopsical verification of the diagnosis, it may be objected that the history of the case, as given, does not warrant the opinion that this was an instance of simple serous cyst. In reply to possible objections, the writer would say that the opinion as to the nature of the cyst was arrived at partly by the process of exclusion, and is based upon the following grounds, namely, both the gross and microscopical appearance of the serum showed none of the

[1] Reynolds's System of Medicine, vol. ii. p. 406.
[2] M. Demons, of Bordeaux.
[3] American Journal of the Medical Sciences for April and July, 1884.

products usually resulting from changes occurring in the seat of circumscribed softenings or old effusions, nor were there evidences of echinococci, cysticerci, or other adventitious products which are known to occur in the brain in cystic form, and the existence of which would almost certainly insure a fatal termination.

ON RECENT PROGRESS IN HOSPITAL PLANNING AND ARRANGEMENTS.

By Keith Downes Young, F.R.I.B.A.,
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It has been well remarked by Dr. Mouat that hospitals in this country have not, as regards their construction and management in relation to the treatment of disease, kept pace with the advance of civilization in other branches of social economy. While, on the one hand, medical and surgical science are constantly and steadily advancing in the path of progress, it must be admitted that, with one or two exceptions, the science which concerns itself with the construction and arrangements of the buildings in which the treatment of the sick has to be done, is very much in the state in which it was twenty years ago. We hear of the same hospital diseases which were supposed to be inherent in the older forms of construction, taking root and flourishing in the newest and most costly buildings; and we look in vain amongst the larger hospitals for any indication of that careful thought for structural improvements, both in general plan and in administrative details, which characterizes in so marked a fashion many of the newer hospitals in France, Germany, and Belgium.

Exceptions must, however, be made in favor of three classes of buildings: (α) Infirmaries attached to workhouses; (β) Hospitals for infectious diseases; and (γ) Cottage hospitals.

In the first two classes much and excellent progress has been made; and the credit for this progress is very largely due to the guiding and controlling influence of the responsible advisers of the Local Government Board.

Of the many large and admirable buildings for the treatment of the sick and infirm poor which have been erected during the last few years, perhaps the Marylebone Infirmary at Notting-hill, is one of the best and most complete examples. This building, which was opened in June, 1881, affords accommodation for 744 patients, in 36 wards of 2 beds each, and 24 wards of 28 beds each. The site is a rectangular piece of

land somewhat limited in area, having a ratio of 82 square feet of site per bed, and the buildings are arranged in four parallel pairs of pavilions running north and south, with the administration block in the centre. The ward pavilions are three stories in height, and the space allotted to patients is as follows: Wall space 6 feet, floor space 72 feet, and cubic space 936 feet. The beds are arranged in pairs with a window between each pair, and the windows are in all cases opposite each other. The amount of space allowed in the wards of workhouse infirmaries was determined by a committee appointed by the Poor Law Board in 1867, and in their report, which forms the foundation for the regulations laid down by the Local Government Board (the successors of the Poor Law Board), they recommend that the minimum cubic space should be 850 feet per bed, and the wall space not less than 6 feet per bed; and in cases where the height of the ward is more than 12 feet, such additional height is not to be taken into consideration in estimating the cubic space per bed. In determining these amounts, the Committee had in view the fact that the cases treated in workhouse infirmaries are largely of a chronic and non-acute character, and that therefore the air space required would not be so large as in wards for the treatment of acute surgical or medical disease. A special feature of the St. Marylebone Infirmary, which does not exist in connection with any other workhouse infirmary, is the Nursing Home, for training women specially in the work of nursing in institutions of a similar nature. This is a step in the right direction, the wisdom of which it is scarcely possible to overestimate. To anyone who has seen the old pauper nurse at work, it will not be difficult to realize the difference between the old order and the new, and to appreciate the altered tone of a ward administered by a properly trained nurse.

The value of hospitals for infectious diseases as a means of isolating the sick from the healthy, and so of arresting the spread of disease, was recognized at a very early period in the history of these institutions. But the necessity for the provision of hospital accommodation seems to have been mainly, if not entirely, felt and acted upon in large and crowded towns where diseases like typhus and relapsing fever have been, under specially insanitary conditions, such as overcrowding and filth, almost endemic. It is only of late years that, owing to the persistent counsel of the Local Government Board, local sanitary authorities have been convinced of the extreme value of even the smallest hospital accommodation as a preventive rather than as a curative agent. In many cases the provision made is of a most temporary and perfunctory nature; and, as Dr. Thorne points out in his report (Supplement to the Tenth Annual Report of the Local Government Board, 1880–81) those hospitals which have been erected under the influence of panic rarely prove adequate for the needs of the district even in non-epidemic times; while the hospitals that are erected in order to prevent epidemics by providing

ready means of isolation for first cases are, as a rule, excellent examples of the kind of provision that is required.

One of the best instances of this is the small isolation hospital built by the Bournemouth Sanitary Commissioners. This hospital comprises at present three detached buildings: the administrative building, in which are dwelling-rooms for the matron and nurses; the ward block; and a building containing mortuary, disinfecting-room, wash-house, and ambulance shed.

The ward block is a reproduction in principle of the small isolation block at the London Fever Hospital; it contains two wards for three beds each, and two wards for two beds each. The three bed wards are placed one at each end of the building, and between each three bed ward and the smaller wards is a nurses' room. The communication between the rooms is by way of an open corridor, off which are placed in projecting wings the water-closets and sinks. This corridor is divided transversely by a wall, which thus separates the building into two equal parts, each part containing two wards and a nurses' room and one of the two water-closet projections. The object of this arrangement is to provide for the treatment at one and the same time and under one roof of two entirely distinct diseases, as, for instance, scarlatina and small-pox. On the opposite side to the corridor is a wide veranda accessible to all the rooms, and which can, with proper administrative precautions, be used by all the patients. The site upon which these buildings stand is amply large enough to allow of the erection of two, or possibly three, more pavilions; but with the existing buildings as the permanent provision always available for the prompt isolation of the first case occurring in the district, it will probably be found, in the event of an epidemic breaking out, more convenient to provide for an increased number of patients by means of tents or huts; the former being disinfected and stowed away, and the latter burnt, at the end of the outbreak.

A remarkably interesting example of a hospital for infectious diseases is the Communal Hospital at Copenhagen, completed in 1883. The reasons put forth by the municipal authorities for the establishment of this hospital are so very pertinent, that no apology need be made for quoting them here: "En bâtissant l'hôpital des maladies épidémiques on ne voulait pas seulement un établissement où pouvaient être soignés les malades atteints de ces affectiones, mais on visait encore à un autre but. Possédant une institution où pouvaient être isolés immédiatement, non seulement les individus atteints d'une maladie contagieuse mais encore les cas suspects, on espérait pouvoir préserver autant que possible la ville des épidémies. Ainsi l'hôpital devait être une institution préventive." (*Descriptian sommaire de l'hôpital des maladies épedémiques de Copenhagen*, par S. T. Sarensen and F. J. Hermann, Copenhagen, 1884.)

The hospital comprises thirteen separate buildings, eight of which are ward blocks, the other five being used for administrative purposes. These buildings are all entirely detached, there being no covered communication whatever between one block and another.

In the front administrative block, which contains the offices and residences for staff, are two points of detail that are noticeable. One is the arrangement for visiting. The patient to be visited (visiting being restricted, so far as possible, to convalescents) enters the building by the door communicating with the garden, and awaits his visitor in a room close to the entrance. The visitor enters the building on the opposite side, and is taken to a room immediately adjoining that in which the patient is, but he traverses no part of the building through which the patient has been before him. Between the two rooms is a window protected by a "grille," and while the patient and his friend can see and converse with each other, they cannot come within touching distance.

The other detail is the arrangement of bath and dressing-rooms for the medical staff. This consists of a bath-room with a dressing-room on each side; when leaving the hospital after going round the wards, the physician enters one of the dressing-rooms, where he divests himself of his hospital clothing, passes into the bath-room, where he takes a bath; and so into the other dressing-room, where he finds his ordinary clothes.

Two of the pavilions are divided up into single bed wards; in one case these wards are for doubtful cases, or for cases needing special isolation; in the other they are for private patients, presumably paying for the extra accommodation.

All the buildings are provided with very complete means of ventilation and warming by the aid of "caloriféres" and hot-air stoves on the system so much adopted in continental hospitals.

An instance of a really complete and well-considered hospital of a purely temporary nature is the Infectious Disease Hospital at Park Hill, Liverpool. The wards of this hospital consist of four pairs of hospital tents and two pairs of iron buildings. The buildings containing the nurses' rooms, bath-rooms, and day-rooms are formed of wooden framing, covered externally with Willesden paper and lined internally with boarding, the interspace being filled with silicated cotton.

A notable fact in connection with this hospital is that it was erected and completed ready for use in less than two months.

The two great "barrack" hospitals at Berlin (the "Moabit" and "Charité") are examples of a more or less temporary method of construction, though neither is used exclusively for fever or smallpox. The wards in both cases are constructed of wooden framework, the interstices being filled at the "Moabit" Hospital with stone, at the "Charité" with bricks laid dry. The "Moabit" Hospital is warmed by means of

steam-pipes from a central boiler-house, while the wards at the "Charité" are each warmed by two iron stoves faced with white Dutch tiles, provided with an arrangement of coils of iron pipes for increasing the radiating surface. In order to overcome the extreme dryness of the air warmed by this means a pan of water is introduced into the stove, in such a manner that the heat of the fire evaporates the water, and the resulting vapor mixes with and moistens the warmed air from the iron surfaces. The "Moabit" Hospital was originally designed, in 1872, purely as an epidemic hospital, but since the year 1875 it has been used for the treatment of diseases of every kind except mental affections. In the year 1880, for example, of a total of 2780 cases treated in the Hospital, 697 are classed as acute infectious diseases, 491 as surgical, and 774 as diseases of the organs of respiration.

The great advantage of temporary hospitals for the treatment of infectious fevers, is the ease and quickness with which additional accommodation can be provided on a sudden emergency; but the danger of fire in tents or huts is a matter that must be provided against in the most careful manner.

Coming now to the subject of general hospitals, under which term may be included the class of small hospitals known as "cottage hospitals," it will be interesting in connection with the question of temporary as opposed to permanent hospitals, to note the views of an eminent authority on the subject, Dr. Billings, U. S. A. After remarking ("Essay on Hospital Construction and Organization," New York, 1875) that the results given by many large and costly buildings were by no means commensurate with the labor, money, and ingenuity expended on them, that hospital diseases had made their appearance in many such buildings, and that attempts at purification and disinfection had not always been successful, Dr. Billings shows how the experience of the military surgeons during the American Civil War and all the recent wars in Europe led to the recommendation that wooden barracks and tents should be adopted for all hospitals. The reasons for this advice were not only that huts and tents are more readily disinfected and ventilated than permanent structures, but that, inasmuch as all the buildings are liable to become saturated, so to speak, after a certain time with the contagion of disease, it is easier and cheaper to abandon or to destroy a wooden hut than it could be to destroy a building of brick or stone.

These views Dr. Billings subsequently modified greatly, and his opinions may be summarized thus: For military hospitals and for infectious diseases, huts are probably better suited than permanent wards; but for general hospitals, where much subdivision of patients is necessary, and where economy of administration is an element to be regarded, permanent structures are preferable. The advocates of temporary wards maintained that their system was unfavorable to the

development of hospitalism. This, Dr. Billings shows to be an error. "I have myself," he says, "emptied a barrack ward and placed the men in tents, on account of the appearance and persistence of septic disease. I have seen a decided tendency to erysipelas and pyæmia appear in a most characteristic barrack ward, an unplastered building, with excessive ridge ventilation, within six weeks after it was first occupied. The weather was warm, and for a week there was little wind, so that the process of natural ventilation was unsatisfactory." ("Essay on Hospital Construction," *op. cit.*, p. 17.) The chief reasons against the adoption of any system of temporary wards are the danger of fire and the great cost of administration consequent on the necessity for the buildings being all of one story only.

The most remarkable and, so far as England is concerned, perhaps the only development in general hospital building of recent years is the circular ward. Like all new inventions, the idea of adopting the circle for the purpose of a sick ward seems to have simultaneously occurred to more than one person. In 1876, when the question of rebuilding University College Hospital, London, was being seriously discussed, the distinguished surgeon to that hospital, Mr. John Marshall, F.R.S., devised a plan an essential part of which was that the wards were in the form of four circular towers. About the same time the foundations of a hospital were laid at Antwerp, the wards of which were arranged in eight circular towers; and at a period probably anterior to this, Sir Andrew Clarke, R.E., G.C.B., now Inspector General of Fortifications, prepared a plan for a hospital in Madras with circular wards.

The first circular wards to be actually occupied with patients were those of the Miller Memorial Hospital at Greenwich, a little building erected in memory of the late Canon Miller, founder of Hospital Sunday. Besides this there are in England three other examples of circular wards completed, viz.: Military Hospitals at Seaforth near Liverpool, and at Milton near Gravesend, and a workhouse infirmary at Hampstead. A general hospital is in course of erection at Burnley, which will have ultimately four ward pavilions of twenty beds each—and in New York, a Cancer Hospital with three circular towers is approaching completion.

The advantages of a circular ward are briefly these: 1st. It can be placed without difficulty in many positions in which it would be impossible to put a rectangular ward; 2d. In the placing of a circular ward upon a site, aspect can be wholly disregarded, except, of course, as regards the relation of the ward block to other buildings; 3d. A circular building can be so planned that the air can have free access to the enclosing walls along the whole length of the circumference—and in whatever direction the wind blows, it must blow at right angles to some point in the circumference; whereas it is conceivable that the wind when blowing in a parallel direction to the longer axis of a rectangular ward would

be practically lost for purposes of ventilation; 4th. A circular ward is economical of wall; of two wards each for a given number of beds and each having precisely the same amount of floor and cubic space, the circular ward will be enclosed in walls of a considerably less linear measurement than the rectangular ward; 5th. Provided that the warming apparatus, whatever it be, is placed in the proper position—*i. e.*, in the centre of the ward—the diffusion of warmth will be far more equable in a circular ward than would be possible in a rectangular ward; 6th. In the matter of free access of light and air a circular ward possesses advantages superior to those of any other form. As Professor Marshall points out, a circular ward is obviously the inverse of the plan condemned so strongly by Oppert, when he says, "the worst wards are those where least air and light are provided," and "a closed court with wards around it is the worst arrangement." (*Hospitals, Infirmaries, and Dispensaries*, by F. Oppert, M.D)

Circular wards have scarcely been in existence long enough to warrant any positive statement being made as to their superior efficiency to wards of a rectangular form; but this much may be said as regards the work done by the Miller Memorial Hospital. In the first place, it has been amply demonstrated by these wards that the fears so strongly expressed that a circular ward would be ill-lighted and objectionable on account of the patients being presumably more visible to each other than in a rectangular ward, are entirely groundless. Then the fact, that during the eight months that the Hospital has been opened a constant succession of cases, chiefly surgical, and of a very severe nature, have been treated in the wards with uniform and marked success, is sufficient to show that the circular form, in this instance at least, is fully equal to the work required of it. Time alone will show whether this form of ward possesses the superiority which its advocates hope for it, in the more efficient aëration, or what may fitly be called its greater self-cleansing properties.

In order to endeavor to ascertain the special characteristics of a circular ward in the matter of ventilation, the Hospital Association has appointed a committee to conduct experiments, and endeavor to arrive at an estimate of the value of the circular form as compared with the rectangular. The task before the committee is by no means an easy one, but it is greatly to be hoped that their investigations will throw some light on a subject that has of late formed the battleground for a somewhat heated controversy.

Reference has been made to improvements in hospital construction abroad. Perhaps the most remarkable instance is the system devised by M. Tollet, and usually called by his name. The main feature of the system lies in the sectional form of the ward, which M. Tollet makes a pointed arch. It is essential to the system that the ward should be of

one story only, as an important feature of this particular form is that the outlet for vitiated air is at the apex of the arch. M. Tollet contends that by the adoption of this form the free passage of air is not liable to be checked by any internal angles. His system of construction, moreover, being entirely of iron and stone, brick, or concrete, is not only fireproof, but is said to present on the inside impervious surfaces, which afford no harbor of any kind for disease germs. Of the many buildings erected on this principle, the Municipal Hospital at St. Denis is perhaps the most complete, and best exemplifies M. Tollet's views. This hospital accommodates 166 patients, including aged, chronic, and infirm men and women, medical and surgical cases of both sexes, lying-in women, infectious diseases of both sexes. The buildings are entirely detached, the wards for medical cases alone being arranged in pairs, with a connecting corridor. The ward blocks are raised about two feet above the ground level, and have underneath an open space about eight feet in height, the ground around the wards being sloped away at an angle of forty-five degrees.

A feature to be remarked in this, as in many other recently erected hospitals on the continent, is the large proportion of land to patients—the ratio at St. Denis being 1570 square feet of site per patient.

The special characteristic, apart from M. Tollet's peculiar form of construction, of the hospitals erected on this system, and the feature that has probably the most important bearing on the well-being of the patients, are the way in which the wards are isolated one from the other, and the perfect classification of diseases of which this arrangement admits. This complete atmospheric severance of the wards is a feature which has been also largely adopted in the most recent hospitals in Germany. The most complete example of this is the Academische Krankenhause at Heidelberg. There are in this hospital eleven separate ward pavilions, connected with each other and with the administrative block by a covered way with the sides entirely open; five of these pavilions being devoted to the reception of surgical cases, four to medical cases, one to skin diseases, and one to diseases of the eye.

Of all modern developments in hospital work, not the least interesting and important is that of the cottage hospital. The first cottage hospital opened in England was that at Cranleigh, in Surrey, which was founded by Mr. Albert Napper in the year 1859. By the year 1879 some two hundred hospitals had been started, and the probability is that this number has since increased to something not far short of three hundred. The hospital at Cranleigh is strictly a cottage, of a characteristic Surrey type, and its essentially cottage character is justly regarded by its founder as a valuable testimony to the success of his system. The building is partly of brick, partly of timber framing covered with tiles, and inside, the old brick chimney breast, the brick

paving, and the corkscrew staircase, with a rope for handrail, all remain to show how little modification the cottage has undergone to fit it for its new duties.

Of the many cottage hospitals which have been erected during the last few years, several fulfil well the conditions necessary to the successful treatment of disease; while many others, unfortunately, repeat only too literally the sanitary mistakes so fatally prevalent in buildings of a larger kind.

In this brief survey of the progress of hospital building in recent years, many points of detail have of necessity been passed over; such, for example, as baths for therapeutic purposes; appliances which, while they are to be found in almost every new and in many of the older hospitals abroad, can scarcely be said to exist in England. It must be admitted that the cause in great measure of the mistakes that are made is the want of *rapport* that exists between the medical and the lay element in hospital administrators. In planning a new hospital, or in improving an old one, an essential element of success is a cordial coöperation between committee, medical staff, and architect; and, unless these three authorities work together, and not, as is too often the case, the committee scheme, and their architect plans, without reference to the medical staff, failure is inevitable.

ABSCESS OF THE PANCREAS AND THROMBOSIS OF THE PORTAL VEIN.

By J. H. Musser, M.D.,

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Abscess of the pancreas is of such rare occurrence that any opportunity to study its pathology should be taken advantage of and the facts, be they ever so meagre, brought to the notice of the profession. It is hoped that this consideration is sufficient apology for the following detail:

Case. *Abscess of the Pancreas, communicating with the Duodeno-jejunal Fossa; Thrombosis of the Portal Vein; Ascites, rapidly recurring after Tapping; Tumor; Emaciation; Marked Absence of other Symptoms of Grave Disease; Death; Autopsy.*—W. B., male, aged forty-two, born in England, single, shoemaker, was admitted to the wards of the Presbyterian Hospital, May 12, 1885, and died June 6th following. He was under the care of Dr. Patterson.

Nothing could be learned of his family history. His antecedent history, regarding health, was good, regarding personal habits, very bad. He was addicted to intemperance, and was known as a "dead beat." For years he had been an outcast; was exposed to all kinds of weather,

and often for long periods was poorly nourished. The duration of the present illness is not known, but from his story and that of some cronies, he had been "going down" all spring. He had never received any injury. He was haggard and emaciated. He vomited once only, on the first day of admission. Marked ascites was observed, but nothing else noted. During the entire period he was under observation he lay in a perfectly apathetic, listless state, taking but little food and exhibiting no signs of suffering. At no time was there fever or sweats. Pain was absent. In addition to ascites, a painless, ill-defined tumor was observed in the epigastrium, and the spleen and liver were determined to be normal. The urine contained a small amount of albumen, but no casts were found. He never had any bloody discharges.

The ascites was so great as to warrant tapping, and this was accordingly done by Dr. Greenawalt, the resident physician. The abdomen was thirty-six inches in circumference at the umbilicus before tapping. Within eighteen hours succeeding the tapping, it had filled entirely, and in twenty-four hours measured thirty-six and a half inches. Without the development of further symptoms he died of exhaustion.

At the autopsy, it was learned by inspection that rigor mortis was present only in the inferior extremities, that post-mortem discoloration of the posterior portion of the trunk and the extremities, and of the neck and shoulders, was marked, that the body was emaciated and bloodless, the face bronzed, the abdomen distended, and the ankles slightly œdematous. By palpation a fixed mass was detected in the abdomen extending from the right mammary line, one inch above the umbilical level, directly across to the corresponding line on the left side. Its upper margin was not well defined, but it appeared to be two inches wide.

On section the abdominal cavity was seen to contain a large amount of clear serum, in which some lymph floated. The intestines were matted together by recent lymph; the parietal and visceral layers of the peritoneum were deeply injected, in parts the seat of small hemorrhages, in parts covered with light lymph. Corresponding to the position of the mass indicated by palpation, the omentum was found, matted together with its inferior border turned upward and lying across the stomach. This organ was fixed and dilated; its inferior border extended to the umbilicus; its pyloric orifice was seen two inches below the ribs in the right mammary line. The liver occupied its normal position. The transverse colon extended across the abdomen along the lower margin of the stomach, thus permitting the omentum to occupy the position indicated above.

Further study of the relations of the abdominal organs revealed the formation of a large cavity containing about a quart of pus. This cavity was formed by the posterior wall of the stomach in front, by the pancreas, the duodenum and transverse colon below, and by an extension of the peritoneum, or rather distention, behind and above. Certainly the pus did not fill the retro-peritoneal space or extend into it, and was not in close apposition to the diaphragm or brim. It was situated in the duodeno-jejunal fossa. Adhesions prevented communication with the abdominal cavity and the retro-peritoneal space.

The above indicated collection of pus was seen to communicate with a large abscess in the pancreas. This abscess was the size of an orange and was seated in the head of the organ, its points of rupture into the duodeno-jejunal fossa being in the middle and upper part. The re-

mainder of the pancreas was made up of dense connective tissue, throughout which there were innumerable pus pockets varying from a pea to a pecan nut in size. The secreting tissue of the organ was not discernible to the naked eye. The ducts were not occluded, but rather dilated, and calculi were not present. The pus was creamy and inodorous, and did not contain any curd-like masses. The portal vein folds of the peritoneum contained a considerable amount of fat, in which were readily detected hard cords representing branches of the superior and inferior mesenteric veins. In a section of the mesentery the vein was distinctly seen filled with clotted blood. The trunk of the portal vein was surrounded by dense fibrous tissue apparently of comparatively recent formation. The mesenteric branches, for a short distance, coursed through a similar structure. The thrombosis was due to the pressure of this adventitious formation, causing obstruction, but not occlusion, of the vein. On close examination of the portal vein its trunk was seen to contain a soft purulent clot, portions of which were free and portions adherent to the walls, which were inflamed, the intima being of a grayish-yellow color, roughened and opaque. No point of ulceration was found, and it was evident that inflammation had just commenced. The dilated hepatic branches of the portal vein were readily traced, and the same changes were present though, possibly, not so advanced. The splenic vein was partially occluded by a soft thrombus. The superior and inferior mesenteric veins were completely blocked by a firm, reddish-brown, laminated thrombus, which was removed with difficulty. In the proximal portions of the vein the centre of the clot was soft and yellow. The walls of the veins were undoubtedly thickened and the calibre increased.

The liver weighed three pounds and one ounce, and was normal in shape. The capsule was opaque, in parts thickened. On section its tissue resisted the knife, and the appearances indicated slight cirrhosis. Portions of the organ were congested. No abscesses were seen, but the portal vein, as noted above, was distinctly traceable, and almost to the periphery showed evidences of recent inflammation. Bile oozed from the cut ducts. The hepatic artery and its branches were unusually prominent. The gall-bladder was distended with unusually fluid bile; the ducts were pervious.

The stomach was dilated. The mucous membrane was intensely congested, mammillated, and in numerous points the seat of submucous ecchymoses due to infarcts. The entire surface was covered with mucus.

As previously noted, the peritoneum covering the intestines presented a high degree of inflammation. The mucous membrane of the large and small intestine was intensely congested; the glands were not enlarged; ulcers were not found; hemorrhagic infarcts were very numerous in the course of the small intestines.

The kidneys were slightly congested and fatty. The capsule was readily removed. The cortical portion was normal.

The spleen was under size, soft in texture, but apparently normal. The suprarenal bodies were normal.

The pleural cavity did not contain serum. The right lung was the seat of hypostatic congestion behind; its apex was adherent; corresponding to the adhesions, punctured cicatrices were noted, with areas of sclerosis in the parenchyma. No cavity was observed. The left lung was congested. Mediastinal glands normal. The heart weighed five and a half

ounces. The posterior leaflets of the aortic valve were fused. The mitral valves were thickened, and the anterior leaflet was contracted. One leaflet of the pulmonary valve was somewhat thickened and indurated.

Brain and spinal cord not examined.

On microscopical examination the pancreas was found to be made up of old and young connective tissue; in the large interstices of the bundles of old tissue, the glandular structure of the pancreas could be readily made out, and the tubules were seen to be in a state of catarrhal inflammation. The intertubular connective tissue was crowded with young cells.

The liver was highly fatty; surrounding the portal vein a crowding of young connective tissue elements was observed, invading the interlobular spaces and extending between the hepatic cells. Sections of one of the branches of the vein which was the seat of thrombus showed an endo-phlebitis of somewhat long standing. The walls of this vein were thickened. The endothelial cells of the intestine were abundantly proliferated. The muscular wall was hypertrophied, and showed slight leucocytic infiltration. The young cell infiltration was, however, much more marked in the adventitia, and extended into the surrounding peritoneal structure. The endothelial overgrowth penetrated somewhat into the clot, which, however, showed no attempts at organization, and was merely a laminated, compact mould of corpuscles entangled in fibrin. Some necrotic changes were observed in the centre of the clot.

The *clinical indications* of abscess of the pancreas in this case, as frequently occurs, were so meagre that the revelations of the autopsy were surprising; and when one observes the extensive disease and alteration of structure, the wonder is not that the abscess was not recognized, but that it could be present with so little discomfort to the patient. The pain, the gastric disturbance, and the fever frequent in abscess in this situation were absent entirely. Emaciation, constipation, a tumor, and pressure symptoms were present, it is true; symptoms and signs, however, due to so many causes so much more common than pancreatic disease, and which affection quite plausibly, therefore, was excluded.

The latency of the symptoms appears to point to the chronicity of the abscess. The histological appearances of the pancreas, and the sequence of the pus formation, peritoneal adhesions, and thrombosis (from pressure), confirm this view.

Reviewing the symptoms present during life in the light of the post-mortem study, some interesting features may be glanced at. The emaciation was very decided, and although almost always present in disease of the pancreas, was thought to be due to want of food and to gastritis and cirrhosis of the liver. Had the intestinal symptoms of pancreatic disease been present, some other explanation for the emaciation would have been given. But constipation was present, and this is often the case in this disease. Its presence alone, however, was not sufficient to point to a correct diagnosis, while it is true the absence of fatty diarrhœa did not permit us to exclude lesions of the pancreas.

Nor was the doubtful presence of a tumor a sufficient indication of the disease. Its ill-defined character, amounting at times only to a sense of resistance, its nearness to the surface, and its painless nature, left one in doubt as to its nature, and certainly did not warrant the consideration of its being the pancreas. The autopsy showed it was due to the omentum, which had been involved in and fixed by inflammatory adhesions.

The pressure symptoms sometimes present in disease of the pancreas, caused in this case the venous thrombosis and consequent ascites. The ascites was thought due to hepatic cirrhosis, but it differed from the ordinary serous accumulation of that disease in rapidly returning after tapping. The absence of enlarged spleen, of enlarged veins in the abdominal walls, and of the diarrhœa and gastric symptoms of portal occlusion, would lead us to exclude that affection. The autopsy showed that the one symptom, ascites rapidly recurring, is sufficient for one to infer its presence.

Roberts (Quain's *Dictionary*) tells us that patients suffering from grave pancreatic disease are often low spirited and despondent, although he doubts the truth of the relationship. Apathy and despondency were quite marked in this case, but might be explained in other ways. In my notes of the autopsy it may be seen that a bronzing of the skin of the face was observed. This has been seen in other cases of pancreatic disease in which the sympathetic system was anatomically involved. Our dissection showed the matting together and involvement of the solar plexus in the diseased process.

It is to be regretted that the urine was not examined for sugar, although it has not usually been present in similar cases. It is worthy of record that, in spite of the severe gastric catarrh, sialorrhœa was absent.

Pancreatic disease occurs most frequently in men, in the middle or later periods of life, and in those of strumous diathesis. A predisposing tendency may be inherited. Alcoholism and mechanical injury are exciting causes of the inflammatory changes. The habits of our patient would appear to confirm this one point. The sex and the age correspond to the usual statistics.

It may be gathered from the preceding remarks that the diagnosis of the patient's affection was cirrhosis of the liver. Even with the most careful scrutiny, it appears to me there were not sufficient grounds for making any other diagnosis. The habits and age of the patient, the emaciation, the anorexia, the ascites, and the absence of renal and cardiac disease, would direct our attention to this hepatic lesion. From the preceding review of the clinical history of this case, the following train of symptoms would permit us to infer that some form of pancreatic disease was present. They are progressive emaciation, despondency, bronzing of the skin, without the asthenia of Addison's disease, constipation, and

thrombosis of the portal vein. In the latter instance other causes of thrombosis must be excluded. If the other symptoms of thrombosis, viz., diarrhœa, enlarged superficial veins, and enlarged spleen, be present, I cannot see how a differential diagnosis from hepatic cirrhosis could be made. A long duration of the disease and the physical signs of cirrhosis of the liver, both uncertain elements, would favor that affection.

The comparatively slight alterations in the hepatic structure lead one to infer that portal obstruction was not of very long duration. Phlebitis of the portal vein and its hepatic branches was certainly comparatively recent. It is of interest to note that, in spite of the cutting off of a considerable amount of blood supply, bile was freely secreted. The enlarged hepatic arteries are evidence that this vessel compensated for the loss of portal radicles. The thrombus, from its laminated appearance, formed slowly, no doubt; on account of pressure on the vessel the blood current was slackened. The dissection distinctly showed that there was no pressure on the splenic or gastric vessels, and hence the absence of the symptoms thereof. It is to be regretted that the course of the collateral circulation was not observed.

The rupture of the pancreatic abscess and its limitation to the duodeno-jejunal fossa are believed to be unique. So far as I have examined the subject, a similar case has never occurred. Treves, in his lectures on the anatomy of the peritoneum, states that this fossa is of no practical importance and is not concerned in the production of internal hernia. On the other hand, Allen (*System of Anatomy*) quotes Treitz, who believes many cases of retro-peritoneal hernia have their point of origin in this locality. A number of other authorities quite agree with Allen. None of them refers to abscess in this locality.

Nothing has been said of the peritonitis. It was, no doubt, due to extension from the pancreas. It did not present any clinical phenomena during life, save the previously noted tumor. The excessive gastric catarrh was due more probably to the habits of the patient than to any effects of obstruction of the gastric vein. The intestinal catarrh was, no doubt, due to the venous thrombosis.

Complicated as this case was, I will finally observe, how much more complicated it would have been had the abscess burrowed into the retro-peritoneal space down to the groin or to the buttock. Verily, the problem of the recognition of disease of the pancreas has not been solved.

What means could have been employed to cure our patient? Had the diagnosis been made, unquestionably, laparotomy should have been performed, and one can see that it alone could have been of service. Without a definite diagnosis, in this advanced day of abdominal surgery, an exploratory operation should have been done. Since the admirable paper of Senn, it would be culpable to neglect resorting to operative measures for certain diseases of the pancreas.

In conclusion, it may be stated, from the present study, that abscess of the pancreas may occur in persons of intemperate habits, of the male sex, and after the age of forty. It may be almost entirely latent, or present the only positive symptoms of emaciation, constipation, and pressure phenomena, and, doubtfully, of despondency and skin bronzing.

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ON SOME POINTS IN THE PRACTICE OF ARTIFICIAL RESPIRATION IN CASES OF STILLBIRTH AND OF APPARENT DEATH AFTER TRACHEOTOMY.

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The subject of artificial respiration is naturally preceded by a few words on stillbirth. That the popular use of "stillbirth" as synonymous with "deadbirth" is incorrect, is proved by the generally used and quite correct phrase "resuscitation of stillborn children." If the children are dead, they obviously cannot be resuscitated. Again, the phrase cannot mean birth without any of the signs of life, for, speaking generally, the heart is beating. The expression, then, practically comes to mean birth without obvious movements, whether of respiration or of other kinds. This, after all, is the plain meaning of the word "still." All deadborn children are therefore stillborn, but all stillborn children are not deadborn.

A child born alive but "still"—that is, generally, but not necessarily, with its heart beating, but without movement—may be in one of two stages or states, for the description of which we are indebted to Cazeaux.[1] In the first, which he calls the "apoplectic state," the surface is livid, but the muscular tone is not lost, and there is no response to reflex irritation. In the second, which he calls "syncope," the surface is pale, the muscular tone is lost, and there is no response to reflex irritation. These two states are also known as the livid stage and the pale or flabby stage of asphyxia.

The relation of these two stages to each other is not finally determined. It is known that the head of the fœtus is subjected to great pressure in its passage through the genital canal, and that hemorrhages into the brain and spinal cord are so commonly[2] found in the bodies of children born dead or dying soon after birth, that it is probable that such hemorrhages are by no means invariably fatal. No necessary con-

[1] Cazeaux, Gaz. méd , 1850, No. 17, p. 317, and Traité des Accouchements, Bruxelles, 1845, p. 34.

[2] Litzmann, Die Geburt bei engen Becken, Leipzig, 1884 (passim).

nection apparently exists between serious lesions of this sort and stillbirth, in the sense that in cases of dangerous stillbirth such lesions are necessarily present. Moreover, the worst cases of both varieties occur where the head is born last, and has, therefore, suffered less pressure than usual.

The state of asphyxia at birth is an exaggeration of the state of strong "necessity of breathing," which is normally produced during labor. As the intrauterine pressure rises, and the placenta is pressed upon with increasing force, as the placental site diminishes with uterine retraction, the fœtal circulation becomes progressively embarrassed, the external sign of which is retardation of the fœtal heart. The complete or virtual abolition of the placental circulation which generally ensues on the completion of the birth of the child, and the shock of the relatively cold air, may either of them be competent to excite the first inspiration. Sometimes, however, matters have gone further, and the child is too asphyxiated for the moment to be roused. On the other hand, pressure on the cord, or separation or great squeezing of the placenta (such as occurs in head-last cases, when the head is in the vagina, and the uterus is already in the third stage of labor before the child is born) may excite premature inspiratory efforts, convulsive in their nature, which may draw any matters in the genital passages, such as liquor amnii, vernix caseosa, and meconium, not only into the trachea, bronchi, and air cells, but even beneath the pleura. In such a case the child, resuscitated it may be, dies of a low form of lobular pneumonia.

The length of survival of apparently dead children is sometimes remarkable, as the following instances, in which children have been buried apparently dead, and afterward dug up and restored to life, show.[1] Two illegitimate children of separate mothers were buried, and restored to life after several hours' burial. A child was buried five hours, restored to life, and lived three days.[2] A child was buried in a field twenty-five centimetres below the surface during eight hours; it lived four days after its disinterment.[3] A child was born apparently dead; attempts to revive it proving fruitless, it was laid on a bed for several hours, and then put in a coffin. Twenty-three hours after birth it was seen, and, to make matters certain, the stethoscope was applied to the cardiac region, and heart sounds were heard. All attempts to revive it, however, failed, and it died. Such a case as the last suggests the greatest caution, the more so as the body has been opened under similar conditions, and the heart found beating.

The *prognosis* in cases of stillbirth is of the utmost importance as a guide to treatment, but it is not usually made. To attempt to resuscitate

[1] Bohn, "De officio medici forensis," S. 262 (quoted by Schultze).
[2] Bardinet, Bull. de l'Acad. Imp., tom. xxx. p. 1052, No 21, 15 août, 1865 (quoted by Schultze).
[3] Maschka, "Das Leben der Neugeborenen ohne Athmen," Prager Vierteljahrschrift, 43, p. 1, 1854.

a child which is actually dead is useless; though, if the child is fresh, attempts may even here be made for a short time, for the satisfaction of the parents. The certainty of death in the case of fresh children depends on the certainty of the cessation of the heart's action during a considerable period, for the heart may cease to beat for a time, apart from absolute death. In such a case, when the heart has ceased to beat for a considerable time (say ten to fifteen minutes), it might be well cautiously to insert a needle into its apex, before abandoning all efforts at resuscitation.

The question here arises, How long should attempts at resuscitation be continued on the sole ground of the persistent action of the heart? A child whose neck is broken, and who dies eventually with considerable effusion of blood into its spinal cord and brain, has been yet revived and lived for several hours. The case above quoted, in which the heart was found beating twenty-three hours after supposed death, should also be borne in mind. In children who eventually die, the heart revives for a time under artificial respiration, and can be kept beating for some (*e. g.*, two) hours, though the child never draws a breath. Such a case, however, is practically hopeless. It may be stated that if no attempts at spontaneous breathing occur within an hour, and especially if the heart, in spite of artificial respiration, acts with diminishing strength and frequency, the prognosis becomes hopeless.

The second point in the prognosis depends on the diagnosis of the state of asphyxia. In the livid stage the prognosis is usually favorable. It is in itself the less serious form, and possesses the great advantage of retaining the power of reflex excitability. If the heart is beating fairly, it is often sufficient to lay the child on its face, wipe out its mouth, and rub it along the spine, a far better way of exciting an inspiration than slapping the nates. A livid color in a stillborn child is, therefore, a good sign. In the pale or flabby stage of asphyxia the prognosis is far more serious. These are the cases which require all the skill at our disposal, while the slight cases will recover under any treatment, and generally better without any artificial respiration at all; it is these latter cases which form the bulk of those recorded in the journals as "successful treatment of suspended animation by a new method."

In the cases of pale or flabby asphyxia, the prognosis depends on our power to raise the child out of its flabby condition, and render it amenable to reflex irritation. Until this is done, all rubbing, slapping, bathing, etc, are simple waste of time. While the heart beats regularly, we may still hope for recovery up to a reasonable length of time, as we have observed above.

The state of the pupils furnishes an important element in prognosis. In profound asphyxia they are widely dilated, as in death. The re-

establishment of the circulation produces no effect on them, but on the reëstablishment of respiration they at once contract.[1]

If the child is breathing, its respiration may be spasmodic, regular, or mixed, periods of spasmodic and regular respiration alternating. The spasmodic respiration is imperfect respiration, but is gradually replaced in most cases by rhythmical respiration, and the prognosis is good. If spasmodic breathing replaces regular breathing, the reverse is, of course, true.

A few words may here be said on the vexed question of the treatment of the navel-string. It appears that a child gains some four to six ounces of blood after birth, the principal object of which is probably to furnish an additional supply for the newly established pulmonary circulation. This blood is not forced into its body so much as drawn into it by the first inspirations. To deprive a child of seven ounces weight of this amount of blood is the same thing as to deprive an adult, weighing ten stone, of five to seven and a half pounds of blood—a very serious bleeding. In ordinary cases, therefore, it is best to tie the cord late. In cases of asphyxia the same rule holds good, unless manipulations are indicated which require the child to be free from its mother.

It has been recommended, in cases of livid asphyxia, to allow half an ounce to an ounce of blood to escape from the cord. This treatment is probably founded on the full-blooded appearance of the child. The child, however, has *less* blood than it should eventually have, and has no more than a child in the pale stage, the difference being one in the distribution rather than the amount of blood. Remembering that these livid children generally recover, and that the treatment has never been suggested for the pale children, who are the really serious cases, it is probably best, in the meanwhile at least, not to bleed.

The color of the skin, and especially of the lips, is important, whether tending to lividity or to pallor, and a favorable change often precedes the establishment of respiration.

With regard to artificial respiration, it may be stated that four objects are aimed at, namely:

(1) Removal of foreign bodies from the air-passages;

(2) Procuring the patency of the air-passages;

(3) Excitation of the circulation;

(4) Ventilation of the lungs.

(1) With regard to the first,[2] the mouth, and, as far as possible, the air-passages, should be cleared before inspiratory movements are excited, in order to prevent the liquor amnii, meconium, vernix caseosa, and other matters from being inhaled into the lungs. The best method to pursue is the following: Lay the child on its back, with the head hang-

[1] Boehm, Arch. für exp Path und Pharm., Bd. viii. S. 91.

[2] Med.-Chir. Trans., vol lxvii. pp. 105–113, 1884.

ing over the edge of a table, a little lower than the rest of its body. Wipe out the mouth with a soft handkerchief. Press the thorax gently with one hand, stroking the trachea upward with the other, and retain the finger at the top of the trachea until the next manœuvre is complete. The mucus will gravitate toward the posterior nares. Put a handkerchief over the child's mouth, blow gently, and the mucus will be blown out of the nostrils, but not into the operator's face.[1]

If there is great accumulation of mucus in the air-passages, a No. 9 gum-elastic male catheter should be introduced into the trachea, so that the point is three and a half inches from the lips. This length will secure its passing through the glottis, but not as far as the bifurcation of the trachea. Press the thorax gently with one hand to prevent the entrance of air, and blow through the catheter. The opening being low down in the trachea, the air and mucus with it being unable to pass into the lungs on account of its compression by the hand, will rush up through the glottis, and the mucus will be blown into the pharynx. This can be repeated as often as necessary, the general tendency of fluids in the air-tubes being to ascend during respiration, whether natural or artificial, toward the mouth. This manœuvre is more efficient and far pleasanter than the suction usually recommended; it has answered well in practice.[2]

(2) With regard to securing the patency of the air-passages; this is often the greatest difficulty in artificial respiration, particularly where the child is deeply asphyxiated, and the divaricator muscles of the glottis seem to share the general flaccidity of the muscles of the whole body.[3] All methods of artificial respiration by manipulation, except that of Schultze, seem to be often useless, on account of this condition; the method of Schultze, however, seems by some means to render the air-passages patent in many cases where they have remained closed during other manipulations.[4] To pull the tongue forward with forceps is useless, as it does not affect the structures at the base of the tongue, and does not raise the epiglottis. The manœuvre of tilting up the chin with the mouth closed, however useful in adults, permitting respiration solely through the nose, as it does, cannot be of the same use in stillborn children, whose pharynx and air-passages are filled with mucus, and in whom the removal of mucus is one of the great desiderata.[5] Hanging the head backward over the edge of a table does not provide for the patency of the upper air-passages.[6] If difficulty is persistently experienced, a catheter can be introduced into the trachea, and secured at the proper length of three and a half inches, so that it may not slip too far in, or slip out during manipulations. While in the trachea it serves for various purposes, among which is the removal of mucus as described

[1] Med.-Chir. Trans., vol. lxvii. p. 110, 1884. [2] Ibid. [3] Ibid., p. 109, 1884.
[4] Ibid. [5] Ibid. [6] Howard, Lancet, May 22, 1880, p. 797.

above. During artificial respiration fluid will often pour from the catheter, especially if it is held over the edge of the table like a siphon.

(3) The third object, excitation of the circulation, is generally dependent on the fourth, namely, ventilation of the lungs.[1] But pressure over the præcardium has a direct effect in raising the blood-pressure and exciting the action of the heart. This is probably the chief reason for any success obtained by the methods of Howard and Marshall Hall, which are powerless[2] to introduce air into the lungs of stillborn children. It has been said that it is undesirable to excite the circulation in deeply asphyxiated children, since the blood which is supplied to the body is necessarily impure. This objection, however, is theoretical, the truth being that the revival of the circulation gives the best prognosis for the establishment of respiration.

(4) The ventilation of the lungs is secured by various methods of manipulation, of which, for stillborn children, only two are trustworthy,[3] namely, the method of Schultze, and that of Silvester, with its modifications by Pacini and Bain.[4] It may be said at the outset that the method of Silvester (and its modifications), though the best for general purposes, by no means imitates the natural breathing of an infant, which is diaphragmatic.[5] In the method of Schultze, on the other hand, the diaphragm descends, though but slightly. The chief effect of both methods is to raise the upper part of the thorax. There remains the method of mouth-to-mouth inflation, the object of which is to fill the lungs once for all.

These methods will now be described.

A. The method of Schultze.[6] The navel-string being tied, the child is seized with both hands by the shoulders in such a way that both thumbs lie on the anterior wall of the thorax, both index fingers extend from behind the shoulders into the axillæ, and the other three fingers of both hands lie obliquely along the posterior wall of the thorax. The head is prevented from falling by the support of the ulnar sides of the two hands. The operator stands with somewhat separated legs, and bends slightly forward, holding the child, as above described, at arm's length, hanging perpendicularly. (*First position, inspiratory.*)

Without pausing, he swings the child upward from this hanging position at arm's length. When the operator's arms have gone slightly beyond the horizontal, they hold the child so delicately that it is not violently hurled over, but sinks slowly forward and forcibly compresses the abdomen by the weight of its pelvic end. (*First movement, expiratory.*) At this moment the whole weight of the child rests on the operator's thumbs lying on the thorax. (*Second position, expiratory.*)

[1] Boehm, loc. cit., S. 72 et seq. [2] Med.-Chir. Trans., vol. lxiv p. 85, 1881.
[3] Ibid., pp. 85, 86. [4] Ibid., p. 79. [5] Ibid., pp. 64, 65, 82.
[6] Schultze, Der Scheintod Neugeborener, Jena, 1871, S. 162. Ibid., p. 48.

Any compression of the thorax by the hands of the operator must be carefully avoided. The body of the child rests during the first position with the floor of the axillæ on the index fingers of the operator exclusively, and no compression should be exercised on the thorax in spite of the support of the hands to the head, nor should the thumbs compress the thorax in front. When the child is swung upward the spinal column should not bend in the thoracic, but only in the lumbar region, and the thumbs should not at this time strongly press the thorax, but should only support the body as it sinks slowly forward. The raising of the body as far as the horizontal should be effected by a powerful swing of the arms (of the operator) from the shoulders, but from that point the arms should be raised more and more slowly, and by means of a delicately adjusted movement of the elbow-joints and scapulæ on the thorax, the pelvic end of the child should fall gradually over. By this gradual falling of the child's pelvis over the belly, considerable pressure of the thoracic viscera is exercised, both against the diaphragm and the whole thoracic wall. At this point the inspired fluids often pour copiously from the respiratory openings. After the child has slowly but completely sunk over, the operator again lowers his arms between his separated legs. The child's body is thereby extended with some impetus; the thorax, released from all pressure (the operator's thumbs lying now quite loosely on the anterior walls of the chest), expands by means of its elasticity, but the weight of the body hanging, as it does, on the index fingers of the operator by the upper limbs, and thus fixing the sternal ends of the ribs, is brought into use for the elevation of the ribs with considerable impetus; moreover, the diaphragm descends by virtue of the impulse which is communicated to the abdominal contents.

(*Second movement, inspiratory.*) After a pause of a few seconds, in the first inspiratory position, the child is again swung upward into the previous position (*first movement, second position, expiratory*), and while it sinks slowly forward it brings its whole weight to bear on the thumbs, which rest on the anterior thoracic wall, and mechanical expiration again ensues. At this point any inspired fluids always pour copiously from the mouth and nose, and generally meconium from the anus. The proceeding is repeated eight or ten times a minute, but more slowly when the inspired fluids flow from the mouth and nose.

It is most important that at the end of the respiratory movement the weight of the child's body should be entirely thrown on the index fingers placed in the axillæ, and none of it supported by the rest of the hand.

Schultze's method has the disadvantage of being more[1] sudden and violent than some of the other methods, but this can be largely con-

[1] Med.-Chir. Trans., 1881, vol. lxiv. p. 81.

trolled by the operator. On the other hand, it possesses two great advantages: the first is, that in the expiratory position the child is inverted, and gravity assists in removing mucus and other bodies from the air-passages; the other is, that for some reason it does sometimes actually provide patency of the air-passages where other methods fail.[1]

The method of Schultze has recently been assailed on the ground that it fails to introduce air into the lungs. It would be very difficult to devise an experiment which would prove or disprove this.

In the experiments on stillborn children referred to above, tracheotomy had been performed and a canula tied into the trachea, which really removes the chief impediment to the introduction of air in actual practice, such impediment concerning almost exclusively the upper air-passages. As regards the results of autopsies, it must be remembered that the presence of a certain amount of air in the lungs of a stillborn child would not prove its introduction by artificial respiration, since the lungs of children dying *intrapartum* are not necessarily airless,[2] but complete, or even considerable expansion of the lungs of a stillborn child after artificial respiration would certainly prove that air had been introduced by such artificial respiration. It is doubtless true that in some cases all methods will fail, and that all manipulative methods often fail in the case of premature or undersized infants, unless, indeed, the patency of the upper air-passages is secured. It is not enough to prove that in some cases a method succeeds—what is desired is to know the best methods and what to expect of them. The result of considerable experience of all methods of artificial respiration in practice has been to assign to Schultze's method one of the highest places as a means of securing the ventilation of the lungs, and the highest place among manipulative methods as a means of securing patency of the upper air-passages.[3]

B. The method of Silvester,[4] recommended by its author for children and adults: (1) To adjust the patient's position, place the patient on his back, with the shoulders raised and supported on a folded article of dress; (2) to maintain a free entrance of air into the windpipe, draw the tongue forward; (3) to imitate the movements of respiration raise the patient's arms upward by the sides of his head and then extend them gently and steadily upward and forward for a few moments, next turn down the patient's arms and press them gently and firmly for a few moments against the sides of the chest; (4) the feet are to be

[1] Med.-Chir. Trans., 1884, vol. lxvii. p. 109.

[2] Schwartz, Die vorzeitigen Athembewegungen, Leipzig, 1858, S. 136 (Cases 15 and 30). Schultze, loc. cit., S. 132. Hecker, Virch. Arch., 1859, xvi. S. 534.

[3] Med.-Chir. Trans., 1884, vol. lxvii. p. 109.

[4] Silvester, "The true physiological method of restoring persons apparently drowned or dead, and of resuscitating stillborn children," 1858, p. 17. Med.-Chir. Trans., 1881, vol. lxiv. p. 46.

secured, and the arms are to be stretched steadily upward for two seconds.[1] The arms should, if possible, be everted, which gives a greater inspiratory power, by rendering more tense the tendon of the pectoralis major muscles, and they should be seized above the elbow.

The modifications by Pacini and Bain are as follows. That by Pacini[2] is thus described:[3] The feet of the patient being fixed, the operator stands with the head against his own abdomen, and then with his hands takes a firm hold of the upper part of the arms, applying the forefingers behind and close to the armpits, while the thumb is in front of the head of the humerus. Holding the shoulders thus, he pulls them toward him, and then lifts them in a perpendicular direction.

Bain's modification[4] is the following.[5] First method: The fingers are placed over the front of the axillæ, the thumbs over the ends of the clavicles; the operator then draws the shoulders upward and then relaxes his traction. Second method: The shoulders are raised by taking hold of the hands and raising the body about a foot off the table, the position of the arms being at an angle of about forty-five degrees beyond the head. These modifications present no practical advantages over the original method of Silvester for children; in adults they seem to increase slightly the amount of air inspired.[6]

The advantages of Silvester's method are its simplicity and the comparatively large amount of air which it is capable of drawing into the lungs. Its disadvantages are that the supine position of the patient impedes the escape of mucus and other matters from the mouth, and also the fact[7] that it frequently happens that the collapsed state of the upper air-passages prevents the introduction of any air into the lungs.

The methods of Marshall Hall[8] and Howard[9] are incapable of introducing any air into the lungs of a stillborn child, because the chest has no resiliency, and any effect they may ever produce in resuscitating stillborn children must be produced by pressure on the heart, which has the power of stimulating its action and raising the blood-pressure.[10]

We have now to say a few words on direct inflation of the lungs. Various curved canulas have been invented for this purpose, especially in France, but we cannot recommend their addition to the already large armamentarium of the accoucheur; and, if used at all, they must be constantly carried, for their need arises unexpectedly. The best method is that by the mouth. The operation may be rendered clean by the simple method of laying a towel over the child's mouth and breathing through

[1] Med.-Chir. Trans., 1881, vol. lxiv. pp 79 and 86.
[2] Ibid, 1881, vol. lxiv. p. 47.
[3] Pacini, "Di un novo Metodo di practicare la Respirazione artificiale," Firenze, 1867.
[4] Med.-Chir. Trans., 1881, vol. lxiv p. 47.
[5] Bain, Med. Times and Gazette, Dec. 19, 1868, p. 708.
[6] Med -Chir. Trans, 1881, vol lxiv. p 75.
[7] Ibid, 1884, vol. lxvii. p 109.
[8] Ibid., 1881, vol. lxiv. p. 78.
[9] Ibid., p. 77.
[10] Boehm, Arch. für exp. Path. und Pharm., Bd. viii. S. 91.

it. The disadvantages of direct mouth-to-mouth inflation are alleged to be the following: (1) Danger of rupturing the lungs; (2) danger of tubercular infection from the operator; (3) danger of inflating the stomach, and so preventing inspiration by impeding the descent of the diaghragm.

The first can be avoided by gentleness in inflating, and also by leaving the nose free.[1] To close the nostrils, as is often recommended, is useless and dangerous—the nostrils are a valuable safety-valve. The second is founded on an observation by Reich,[2] relating to a consumptive midwife who practised inflation. In thirteen months twelve children delivered by her were attacked with symptoms of bronchial catarrh with fever, and died of tubercular meningitis. The children had no phthisical family history. During the same period the other midwife of the place had no cases of tubercular meningitis. In the nine years previous to the practice of the phthisical midwife there had been only two cases, and in the year after her death only one.

In view of recent researches on tubercle, the above has at least to be remembered. The third is imaginary, so far as artificial respiration is concerned;[3] air in the stomach is no way diminishes the amount of air which can be introduced into the lungs by the artificial methods, and it is easily pressed up from the stomach.

It has been suggested that the entrance of air into the stomach can be prevented by pressing the cricoid cartilage against the bodies of the vertebræ, and also by bending the head well back.[4] Neither of these plans produces the desired effect in children, though the former succeeds in adults.[5]

It remains for us to say a few words on the action of heat. In this matter it is necessary to keep apart the two questions of (*a*) recovery to respiration, and (*b*) avoiding chills. It has been proved that, within limits,[6] the lower the temperature the longer can an animal survive without breathing, and the higher the temperature the more quickly it dies. To keep a child in a hot bath until respiration is established is, therefore, a wrong practice. The hot bath can, however, be advantageously used in alternation with the cold bath, but merely as a means of increasing the effect of the cold bath, and in the pale (flabby) stage of asphyxia this also is useless. Under such circumstances it is best to wrap the child in a warm flannel, and not to waste time on baths, but to proceed at once to the establishment of respiration. The application of warm flannels to the head, which is a valuable nervous stimulant in the case of adults, may be advantageously tried in the case of infants, so soon as any signs of reflex action appear, or even possibly earlier.

[1] Med.-Chir. Trans., 1884, vol. lxvii p. 111.
[2] Reich, Berl. klin. Woch., 1878, No. 37.
[3] Med.-Chir. Trans., 1884, vol. lxvii. p. 107.
[4] Ibid., p. 108.
[5] Ibid , p. 107.
[6] W. F. Edwards, Annales de Chimie, 1818, tome viii. série 2, p. 225.

To sum up the treatment, we may say: Never hurry, it is not a question of seconds, and success depends upon a fine exercise of the judgment. Make a good diagnosis, first, as to life or death; secondly, as to the stage of asphyxia (if life is not extinct). If the child is macerated, it is obviously dead and past hope. If the heart beats, ever so slowly and feebly, it is not dead. If the heart is not beating, death is not certain, unless it can be proved to be inactive for some time. If the child is livid and not flabby, it will probably come round; wipe out its mouth and pharynx, and rub it with a soft cloth down the spine, press gently on the cardiac region. If this produces no effect, inflate the lungs by the mouth, and then by Silvester's method. If air enters the lungs, well and good; if not, try Schultze's method, or insert a catheter, as described above. On the first sign of muscular action, plunge the child into cold water, or into alternate hot and cold baths. Vary the treatment between occasional inflation of the lungs, artificial respiration, pressure over the cardiac region, baths, irritation down the spine, according to the judgment; remembering what may be expected of each method, and that no one will suffice for all cases. Watch for signs of resuscitation, namely, improvement in the color, in movements, in cardiac pulsations, as described above. Never be content until the child breathes regularly, and appears to be continually improving.

Most of the above directions apply to persons apparently drowned. For them, Silvester's method is the best; the air-passages are less likely to be closed, and the mechanism of artificial respiration works better. On the other hand, they have not nearly the tenacity of life of babies, and the hope of recovery in the absence of signs of life is far less.

As regards the parts of the lungs expanded or unexpanded most commonly by artificial respiration, the following are the facts:

(1) The right lung is more usually and more completely expanded than the left. (2) The anterior surfaces are more usually and more completely expanded than the posterior. (3) The apices of the upper lobes are often unexpanded. (4) The same may be said of the anterior inferior borders. (5) One of the places of selection for atelectasis is a strip running vertically along the angles of the ribs on each side of the spine. (6) The patches of expansion or atelectasis, when considerable, are not confined to lobes nor bounded by fissures. (7) The last circumstance is not due to obstruction of the bronchi. (8) The spots of predilection for expansion or atelectasis underlie the regions of greatest and least movement of the chest-walls.[1]

Artificial respiration sometimes becomes necessary after tracheotomy. Under these circumstances, I have proved[2] (1) that emphysema of the anterior mediastinum occurs in a certain number of cases. At the

[1] Med.-Chir. Trans., 1881, vol. lxiv. p. 100.

[2] Ibid., 1882, vol. lxv. p. 85.

Children's Hospital, in sixteen out of twenty-eight cases in which autopsies had been made after tracheotomy, occurring during two years, or in fifty-seven per cent., emphysema of the anterior mediastinum was found.[1] (2) Emphysema of the anterior mediastinum is often associated with pneumothorax, to which it stands in causal relation, and which may be the cause of death after tracheotomy. In two of the cases above referred to, in which autopsies were held after tracheotomy, pneumothorax was found.[2] It was found in no case without emphysema of the mediastinum. The amount of emphysema of the mediastinum was greatest when pneumothorax existed also. In many, if not in all of these twenty-eight cases, artificial respiration had been performed. (3) The air is most likely to burst into that pleura of which the lung is the less expanded. On the other hand, pneumothorax of course helps to collapse the lung. (4) The route selected by the air is the space beneath the deep cervical fascia. (5) Emphysema of the anterior mediastinum may or may not be associated with emphysema of the neck; but their causes are different, and the conditions of their production are opposite. (6) The conditions favoring the production of mediastinal emphysema are division of the deep cervical fascia, obstruction to the air-passages, and inspiratory efforts. (7) The dangerous period during tracheotomy is the interval between the division of the deep cervical fascia and the efficient introduction of the tube. (8) The incision in the deep cervical fascia should not be longer than necessary in the direction of the sternum. It should on no account be raised from the trachea, and this should be particularly remembered during inspiratory efforts. (9) It will probably be found that the frequency of occurrence of emphysema of the anterior mediastinum depends much on the skill of the operator, especially in inserting the tube. (10) If artificial respiration should prove necessary, the tissues should be kept in apposition with the trachea, and any manipulations performed steadily and without jerks. (11) Schultze's method (which is not otherwise suitable for the above purpose) is especially prone to produce emphysema of the anterior mediastinum. (12) These observations illustrate the fact that, apart from the question of tracheotomy, the inspiratory force of the thorax should be remembered in all operations near the root of the neck, whether dealing with vessels or not, and in the case of all collections of pus beneath the deep cervical fascia. In these cases quiet respiration is essential for the safety of the patient, and vomiting, which begins with a sudden inspiration, is dangerous.

The passage of the air from the tracheotomy wound along the anterior mediastinum illustrates the production of emphysema of the neck during labor and during violent expiratory efforts.[3]

I have proved that (1) the cause of emphysema of the neck during

[1] Med.-Chir. Trans., 1884, vol. lxvii. p. 102.
[2] Ibid., p. 102.
[3] Ibid., 1885, vol. lxviii. p. 66.

labor is rupture of the lung tissue, the air escaping near the root of the lung, passing beneath the pulmonary pleura into the anterior mediastinum, and so beneath the deep cervical fascia into the neck. The route thus marked is the same by which air sometimes passes into the anterior mediastinum after tracheotomy. (2) The weakest parts of the lungs are opposite the pleural reflections (that is, the fissures) and the interlobular spaces. The anterior surface of the root of the lung is the weakest spot while the lungs are within the thorax, being that pleural reflection lying within the comparatively unsupported area near the upper aperture of the thorax. (3) Pneumothorax, when it occurred during experiment, had nothing to do with the production of emphysema of the neck, and in two experiments was not associated with this emphysema, which thus exactly imitated that occurring during labor. (4) The healthy bronchi and trachea are able to resist the greatest possible expiratory effort.

ON DIGITAL EXAMINATION OF THE NASAL CHAMBERS AND DENUDATION OF THE TURBINATED BONES IN THE TREATMENT OF CHRONIC NASAL CATARRH.

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In the varieties of chronic catarrh in which the discharge is purulent or composed of crusts, the mucous membrane covering the middle turbinated bones will be found to be thickened and softened. In the atrophic form of the disease, the inferior turbinated bone will participate in this condition, and the entire interior of the nose may be lined with membrane which is so far changed from the normal type as to be scarcely recognizable by any of the characters which anatomists employ in its description. I have been for some time in the habit of studying these altered structures as though they were periosteum and bone respectively, and of being guided in their treatment by principles similar to those which are relied upon in treating the diseases of the periosteum and adjacent tissues. In a word, the nasal mucoperiosteum can be divided or removed, the bone can be scraped or excised with freedom and often with advantage.

In order to determine with an approach to accuracy the condition of the interior of the nose, it is well in all cases of chronic catarrh to make a digital examination. It is proposed to conduct the examination in the following manner. The patient being placed under the influence of an anæsthetic, the index finger is inserted into the nostril and by gentle pressure the tip is directed upward and backward in order to

reach the plane of the level of the middle turbinated bone—a manipulation which is accomplished without difficulty. If the membrane covering the bone is in a healthy condition, the sensation to the finger is the same as though a firm yet resilient surface had been touched. If the parts are chronically inflamed, the membrane is much softer than in health, and is at once detached from the bone at the point of contact. By pushing the finger along the course of the bone the membrane is removed with ease. Should the bone be wedged against the septum, it can be forced out into a more favorable position; should it be found lying too far outward along the lateral wall of the chamber, it can be brought nearer the median line. The examination cannot always be completed without displacing the perpendicular plate of the ethmoid bone. The plate in many patients is not so thick as the vomer, and its ability to resist the pushing force of the finger is correspondingly diminished. The act of displacement is accompanied by a cracking sound, and the moderate resistance to the entrance of the finger to the plane of the sides of the middle turbinated bone is at once removed.

By the ordinary method of inspection the width of the middle turbinated bones cannot always be defined, but by the aid of the digital examination here proposed the relative width can be easily made out. As a rule, the wider bone lies on the side toward which the perpendicular plate of the ethmoid bone is deflected. The disposition for one of the two bones to be of unusual size, occurs at my hands so frequently as to suggest the probability that an exceptionally large lateral mass of the ethmoid bone may act as a predisposing cause to chronic inflammation. It would appear that the large surface is placed at a disadvantage in flushing off excess of secretion; the parts remain for long times together unventilated, and the temperature of the region maintained at a point too high to be consistent with health. Occasionally the entire region of the lateral mass and the adjacent septum are matted together by the products of inflammation, which evidently have been the result of prolonged sequestration. The anterior free end of the bone should next receive attention. This portion is often found wedged tightly between the median and the lateral walls of the nose, and can be examined with difficulty. It may be necessary to employ a bone-scoop or chisel to scrape away the membrane covering the part, and even to remove by breaking down the firm nodule of bone which frequently constitutes the tip.

Next in order the lower plane of the nose should be explored. This part of the examination is the least satisfactory by reason of the fact that the bones are at this plane more resistant and oppose the entrance of the finger to an extent which oftentimes prevents the operator making a complete digital search. Fortunately this region of the nose can be readily seen, and the difficulty, in truth, becomes a matter of minor

importance. If the septum is found deflected, it is now an appropriate time to remove the spur or to effect any procedure which experience has shown to be useful. The mucous membrane adheres much more tenaciously to the inferior than to the middle turbinated bone, and is less easily detached.

The bleeding following the exploration is moderate in amount and is easily controlled. The simple examination, without accompanying employment of instruments, can be completed in a few moments. The amount of the anæsthetic required is no larger than is needed to extract a tooth or to incise a felon. In one instance only did any untoward event follow the introduction of the finger. An inflammatory swelling of the septum ensued which gave to the patient the sensations of a severe attack of coryza. The condition slowly yielded to repeated scarifications and rest.

In those cases in which the discharge is purulent and offensive, portions of bone are found exposed and the mucous membrane lying in tags over extensively diseased surfaces. In such subjects the membranes are thicker than in health or in the chronic non-suppurative form of disease. The condition is confined to one side of the head.

The results of the manipulation have been most encouraging. The denuded surfaces become covered with a normal membrane, the discharge is lessened in quantity and is less tenacious in character. Cases of the most pronounced type of fetid catarrh have so far improved after a single digital examination and denudation of the middle turbinated bones as to be further advanced than would have been the case if the manipulation had been omitted and a long course of local applications substituted.

The treatment of each case after the denudation, is to be conducted on the same principles as have been generally accepted, and these need not be detailed in this place. The use of the electrocautery, the application of strong solutions of nitrate of silver, have now the happiest effect. Should the new membrane become tense and brawny, it may be occasionally deeply incised or small portions of the surface scraped by a bone-spoon or a chisel.

It is submitted that the manipulation is an aid to the diagnosis of nasal affections, and that the act of denudation is a safe and useful procedure.

NOTES TOWARD THE FORMATION OF CLINICAL GROUPS OF TUMORS.

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(Continued from page 161.)

Melanotic Whitlows.

Amongst the several peculiar clinical forms which melanotic sarcoma presents, under the influence of what may be called the law of modification by locality, we have the melanotic whitlow. The resemblance of this disease to a chronic whitlow is so close, and the quantity of melanotic growth so small in the early stages, that it is almost always treated at first as being simply a disease of the nail. It needs sometimes the eye of faith to recognize the narrow band of black which borders the inflamed part. It would seem that the power to produce a pigmented structure is but feeble in the neighborhood of the nails; whenever there is much growth a non-pigmented mass is produced. Only at the edges of this is to be found the black edge which marks the original type. This mixture of colored and uncolored growth in melanotic sarcoma is, of course, common in all parts, but in none is it, I think, so marked as in the proximity of the nails.

A drawing which has been recently added to the collection of the Museum of the Royal College of Surgeons well exemplifies this. It is from the thumb of a middle-aged man, in whom the growth had been slowly developing for several years. The condition presented is that of a knob as large as a walnut at the end of the digit. All trace of the nail is lost, excepting at one or two parts. The growth is ulcerated over its whole surface, but shows no tendency to slough or become fetid. Just under its overhanging border there is in the unswollen skin a narrow margin of coal-black structure, which is conclusive as to its nature. This was demonstrable with great certainty in the patient, but is scarcely so in the drawing.

About twelve years ago I saw, through the kindness of Sir James Paget, the thumb of a gentleman, well known in the racing world, which presented this condition in a very early stage. The nail was simply thickened and fibrous, and the disease had by some been supposed to be only a chronic onychitis. At the edge of the nail on one side, however, was a definite black edge, not in the least raised, and looking very much as if the part had been touched with lunar caustic. Sir James amputated the thumb, and he told me afterward that an assistant at the operation avowed incredulity as to there being any melanosis, or any good reason for the operation. Eight or ten years later the diagnosis

was confirmed by a return of the disease under the scar, and I amputated again at the carpo-metacarpal joint. A year later, I had to remove melanotic glands from the armpit.

Two cases, of which I have given portraits in my *Illustrations of Clinical Surgery*, show the state produced when the disease is allowed to advance. In one, from the great toe of an elderly woman, we see a large open ulcer involving the whole nail-bed and much enlarging its area. On this surface most of the structure is pale, but there are a few ill-margined masses in it which show pigment. In this case the patient, some months after recovering from amputation of her toe, had enlarged glands in her groin, and, after removal of these, others within the brim of the pelvis, which led to her death. In this instance, as in so many others, a mistake in the diagnosis led to a long delay in operative treatment, and was the cause of its non-success.

Another portrait, which forms part of the same plate, shows the melanotic growth creeping in the skin to some little distance from the nails. It shows no tendency to ulcerate, and but very little to growth, the layer of black being still very thin, indeed. In this the blackness had been mistaken by a superficial observer for that caused by caustic.

I might produce several other examples of the melanosis-whitlow, but enough have been given to illustrate the peculiarities of the disease when occurring in this position. It spreads slowly, destroys the nail, and the fungating growth which it finally produces fails altogether to obtain pigment and is quite colorless. The disease is slower in its stages than is the case with melanosis in most other positions. So far as I know, the growth presents no histological peculiarities; although its stages are slow, it tends eventually to affect the lymphatic glands and other parts with great certainty, and thus brings about the patient's death. Yet there is much greater hope of delaying the progress of the disease by operation than exists in most other forms of melanosis. I am not sure, however, whether this last remark will hold good as regards melanosis of the choroid, for we sometimes find, after removal of the eye for this disease at an early stage, that the patient secures a long period of immunity.

A New Form of Epithelial Cancer of the Face (the Crateriform Ulcer).

I have already adduced the facts as to the peculiarities of the form of epithelial cancer known as "rodent ulcer," as illustrating the influence of local origin. It is a matter of common knowledge that well-characterized "rodent ulcers" are rarely seen, excepting on the face, and mostly near the eyelids, and that upon these regions the other varieties of epithelial cancer are scarcely ever met with. I have now, however, to introduce a competitor upon this special territory. There is a form

of malignant growth of epithelial type, but of remarkable peculiarities, that produces an ulcer which, provisionally, I have been accustomed to speak of as the crateriform ulcer. It is met with, so far as my experience goes, only on the upper part of the face, and more especially prefers the precise localities of the common rodent ulcer. It is rare, and I have seen only six or seven examples of it. All of them, allowing for differences of stage, were exactly alike.

The first stage is a bossy, rounded lump, which rapidly attains considerable size, and presents a somewhat conical summit. At this summit ulceration takes place, and, with exceedingly little of suppuration or obviously destructive inflammation, a deep cavity forms. It is at this stage that the term crater-like is applicable. The walls of the crater are of much thickness and of great firmness. The growth is much less vascular and less succulent than that of rodent, and, whilst it is easy to scrape the latter away, it is quite impossible to do so with this. I attempted it in one instance, and, though I used large and sharp instruments, the procedure was very unsatisfactory. The patients in whom these very peculiar ulcers form are like the subjects of rodent in all respects. It begins usually in those past middle age, and without any obvious cause. It is rapid in its progress, and grows as large in a few months as rodent would in as many years. It shows, so far as I have observed, no tendency to fungate or become warty, and in this respect, as well as in its hardness of structure, density, and thickness, it differs from what we observe in common epithelial cancer of other parts.

I am very sorry that I am not by any means as yet in a position to give the complete clinical history of this singular variety of local disease. I have not watched any single case to its end, and I do not know whether it usually causes the lymphatic glands to enlarge. All the cases which I have seen were subjected to early operation, and it would seem that excision is very successful, and relapses exceptional. In one case in which I excised the right upper eyelid of an elderly woman on account of a growth of this type, no recurrence ever took place on this side. Two years later a precisely similar growth developed itself on the other eyelid with exact symmetry. This second rapidly grew to a large size. It was in this instance that I attempted to scrape the growth away and failed. I believe, but am not quite sure, that enlargement of glands subsequently took place in this instance. Of four other examples of this disease—three under my own care and one under that of Mr. James Adams—I may briefly say that they all fitted exactly with the description I have given, were all seated on the upper part of the cheek, and were, one and all, excised within about six months from their beginning. So far as I know, no recurrence took place in any. Most of them were examined with the microscope, and the report always was that elements

characteristic of epithelial cancer were present. In my next case I shall be able to give a detailed account of the histological conditions.

A man, aged forty, was sent to me from Ipswich, with a very peculiar growth involving the right ala and side of his nose. There was great thickening, but very slight ulceration. The growth was ill-defined and involved both mucous membrane and skin. Sir James Paget was kind enough, at my request, to see the patient, and give me the great advantage of his opinion. It was that we had to do with an example of acute epithelial cancer, which ought to be excised immediately. It had been growing only a few months, and had distinctly begun, not with ulceration or warty growth, nor by any surface change, but by thickening of the substance of the ala. Only quite recently had any tendency to ulceration been observed. The ulcer just beginning was tending, as usual, to produce the crater form, but it had not advanced deeply.

I excised the whole of the ala and side of nose in its entire thickness. I did the operation with much misgiving, for the growth was so ill-defined that it seemed very likely that parts already more or less infiltrated might be left. I cut, however, very freely, and left the whole of that nostril open. No attempt was made to close the wound; the healing progressed well, and in due time the man was fitted with a shield to conceal the gap.

It is now three years since the operation, and I believe that he has never had any signs of recurrence.

This case is of especial value on account of the long-proved immunity from return, longer than is usual in rodent or the more common form of epithelial cancer, and certainly far longer than the conditions in this particular case justified us in expecting. Observing this result in most of the cases operated upon, I am induced to believe that this special form of growth is less malignant than either of them as regards local recurrence, and less so than common epithelial cancer as to gland implication. The following valuable report as to microscopic appearances has been furnished to me by my friend, Dr. A. Sangster, than whom no one is better qualified to give an opinion on such facts.

"In sections cut vertically to the cutaneous surface and examined under a low magnifying power, the sebaceous glands were seen occupying a continuous layer. Although it is difficult to say what constitutes departure from the normal as regards the size of sebaceous glands in this situation, there was little doubt that they were, in this instance, hypertrophied. At one end of the section (that remote from the focus of disease) the epidermis (Malpighian layer) was normal in appearance, as were also the subjacent and surrounding tissues; soon, however, on approaching the opposite extremity of the section—the sebaceous gland formation began to betray great irregularity; the mouths of the hair follicles gaping. Still the Malpighian layer, where it could be traced, was normal in such prolongations as there were, appearing rather in association with gland formation, than as finger-like interpapillary processes. Associated with this irregular gland-formation there was abundant cell-infiltration of the subjacent tissues and tracts, and rounded masses of epidermic cells (showing distinct capsular lamination under a

high power) were seen in this situation, in great abundance, surrounded by the small round-cell infiltrated tissue.

"At that portion of the section most remote from the normal structures, the sebaceous glands attained the maximum of irregularity and degenerative change. Here they were rather recognizable as lacunar spaces with irregularly crenated outlines. Here and there, lying in the spaces, could be recognized the shrunken yellowish masses of degenerated sebaceous material.

"Lying in close proximity, there were isolated rounded masses of epithelial cells having a central area occupied by a yellowish material, identical in appearance with that seen in the lacunar spaces above alluded to; these might pass as epithelial nests.

"I am of the opinion that the material is from a case of epithelioma, probably originating in the sebaceous glands."

I think I may claim to have now proved my point, that we have in the crateriform ulcer a variety of epithelial cancer, of which the clinical features—its aspect and history—are more valuable for diagnosis than its microscopic peculiarities. It differs widely from rodent ulcer, and as much so from the common type of epithelial cancer, and it presents naked-eye features which may be recognized at a glance.

Recurring Fibroid of the Skin (Spindle-celled Sarcoma).

I may confess that it has not been without regret that I have witnessed the submerging of Paget's clinical group of "recurring fibroids" in the large histological family of spindle-celled sarcomata. It might possibly have been more convenient in practice to have pushed the clinical grouping into more detail, and whilst recognizing the family relationship, to have tried to ascertain by the careful collation of parallel cases, whether the life history of these growths does not differ considerably in connection with the precise tissue and region in which they originate. My attention has been strongly drawn to the remarkable sameness of appearance and of tendencies of these growths when they originate in the skin or close under it. Examples of the cutaneous fibroid recurrent are very rare, but they are very peculiar in the mode of development and the inveteracy and rapidity with which they recur on extirpation. The fallacy which is always present when a deeply placed fibroid tumor returns after excision, namely, that it may possibly not have been completely excised, scarcely exists in those of which I am now about to speak. It is usually easy to make sure that the whole of a growth springing from the skin has been removed. Yet no cases could possibly illustrate more strongly the tendency to local recurrence than did those which I am now about to relate. Most surgeons of extended experience will, I expect, be able to recall to memory two or three (and probably not more) and will bear me out in the statement that they are all almost exactly alike.

The case which first interested me in this subject was that of a girl named Holland, whom I saw in Guy's Hospital, under Mr. Cock's care, in 1853. The growth had begun after a slight injury at the age of thirteen, under the skin of the left thigh. Mr. Cock excised it freely six times during seven years.[1] Finally, I believe, the limb was amputated, with the result that although the stump healed well, a recurred growth developed itself just where the tourniquet pressed. My memory does not recall a single case at all closely parallel to this during the twenty-five years of my official connection with the London Hospital, either in my own practice or in that of my colleagues. In private practice I have seen three. In only two of these were operations performed, and, respecting the third, I can only assert that its external features were precisely the same as those of the others. In two out of the three the growth was, as in Mr. Cock's case, on the thigh, in the third on the lower part of the abdomen. I have never seen the recurring fibroid of skin on the upper extremities, on the head, nor, with one doubtful exception, on the upper part of the trunk.

In the case just referred to as occurring on the abdomen, the patient was a woman of forty-six. The growth occurred as a number of rounded lumps confluent at their bases and covering an area of skin just below the umbilicus as large as two outspread hands. These had been extending with intervals after three operations, for sixteen years. During the last eleven the disease had not been interfered with. I possess a good colored portrait of the condition, which is exactly like that presented in one of the two following cases. The area involved was so large that I could not advise any further operation, nor, as will be seen, had my experience of other cases been such as to make me hopeful.

About fifteen years ago I saw at the request of Mr. Robert Cook, of Stoke Newington, a gentleman of about forty-five, named Hamilton. He had a growth on the front of the left thigh, a little above the knee, which involved the skin. It had begun, he said, in the site of a laceration from the horn of a bullock. The lesion consisted in a group of soft lumps, some of them solid, others containing blood. I excised the whole very freely and during the next four years six similar operations were performed. On one occasion, during my absence from town, the recurrent growth was excised by Sir James Paget, and I mention this as an additional guarantee that the operations were liberal. The very large wounds which were made always healed by granulation with remarkable rapidity, and in the end the whole front of the thigh had been skinned. The disease always returned, either in the middle of the scar or under the healthy skin under one part of the edge, and it always was at first in the form of a little tubercle, which rapidly became converted into a blood cyst. If let alone, the tendency was to fungate and to bleed. None of the growths ever became in the least warty. I used the actual cautery on several occasions and once at least destroyed the growth with chloride of zinc. Mr. H. at length became, not unnaturally, disappointed at the want of permanent success from legitimate surgery,

[1] See Medical Times and Gazette, vol. ii., 1853.

and placed himself in the hands of a charlatan. After this I did not see him again until he was dying. He was then very cachectic, being exhausted from hemorrhages and had a large tumor in his abdomen. I succeeded in obtaining a post-mortem, the chief result of which was to show that the abdominal tumor was in connection with the liver, and consisted of a cyst, the walls of which were nowhere more than a quarter of an inch in thickness and which contained blood. This cyst was as large as a child's head. I believe, but I cannot remember for certain, that there was a history of malignant disease in the family. The whole duration of his disease from first to last must have been more than five years. He never had any gland enlargements.

The subject of my third case was a gentleman in physical appearance almost the counterpart of Mr. Hamilton. He was a spare, gray man, looking older than his years. I first saw Mr. Knight at the request of Mr. James Adams, and in consultation with him, but it may be well to date my narrative from the time when, in consequence of Mr. Adams's illness, Mr. K. passed under my own care; this was in February, 1884. It was then five and a half years from the beginning of the disease; and three operations had been performed, with prompt recurrence after each. Mr. Knight's statement was as follows: "I was staying at the sea-side and used to bathe, and toward the end of the time noticed that the salt water always smarted on the back of my thigh. I got my wife to look at it, and she said that there was a tiny red spot there. A few weeks later there were three little red spots; and after this they rapidly grew together. I consulted a surgeon, who advised me not to meddle with it, but two years from the beginning I went to Sir James Paget, who said that it must be excised without a day's unnecessary delay. Having got this opinion, I placed myself under Mr. James Adams (August, 1880), and got the operation done; seven months later it was necessary to excise the scar again; nine months after this it was excised again."

It was some months after the second operation that I first met Mr. Adams, in consultation, on account of a third recurrence. The former operations had been very free, and the back of the thigh from the popliteal space half way up was occupied by scar. At the edges of this scar in several places were a few little nodules of recurred growth. They were painful, but so small that unless the patient had himself pointed them out they might have been easily overlooked. We advised another operation; and this was done by Mr. Adams. After this I did not see Mr. Knight for two years. When he came to see me in 1884 he had still no gland disease, and the recurrence was strictly local. It consisted chiefly in the development of a mass from the middle of the scar, an inch and half in height, and in shape not unlike a pigeon's egg set on end, and this had ulcerated at several spots, and was just beginning to cause pain and to bleed. I wrapped it up in chloride of zinc, and in a week it sloughed off, leaving a deep wound. In the course of another week there had sprouted up from the bottom of this wound a fibroid fungous mass a quarter of an inch in height.

After this I again used chloride of zinc, and lastly in December, 1884, I excised an enormous elliptical portion of skin, including the scar of the former operations, and extending an inch at least beyond all suspicious portions. This operation laid bare the hamstring muscles and peroneal nerve. The wound granulated well, but was long in healing. No sooner had it healed than a soft mass formed under the scar.

Mr. K. declined further interference, and sank from exhaustion in August, 1885, seven years from the beginning.

It will be seen that these cases resemble each other in the remarkable persistency with which local recurrence took place, and in the absence throughout of any tendency to gland disease. In each, the early stage of the new growth was insidious, and for some time very slow; but, if left alone, there was ultimately a tendency to fungate and to the formation of blood-cysts. The deep fascia became involved if the growth were neglected, but in the first instance the skin alone was implicated. It will easily be understood that the operations were done with the utmost freedom; they were by three different operators, and most of them were done after we had full warning as to the tendency to recur. I can speak for my own, and I have not the least doubt that those done by my friends were at least as free. I took the skin away more than once, an inch or an inch and a half wide of the new growth: yet on no occasion did we obtain more than six months' immunity. The tumors were, I think, softer in structure, and grew more rapidly with each recurrence. Their elements were repeatedly, and by different microscopists, assigned to the spindle-celled sarcomata.

Any one who takes the trouble to compare the three cases which I have adduced, may possibly be inclined to doubt whether treatment by operation offers any advantages to the patient. In the case in which operative treatment was abandoned eleven years ago, the patient is alive, and although the disease is extensive she does not suffer much from it. The subjects of the two others both died at the end of about seven years, having undergone repeated operations, involving expense, much confinement to the house, and some pain. Perhaps, however, these facts do not afford us a fair picture, and we must collect others before we venture to formulate rules of practice. Mr. Birkett has mentioned to me a case in which a middle-aged gentleman, who had undergone several operations with the result of rapid recurrence, was finally cured by a free application of chloride of zinc. I may record, also, a case which was some years ago under my own care, in which I excised from the pectoral region of a young girl a fungating tumor of similar nature. In this instance the patient is now, some six years later, without recurrence. At the time of the operation there was said to be no family history; but since then the patient's mother has died of cancer of the breast. Perhaps I am now falling into the error of leaving the clinical guides for classification, and adopting the histological ones. In this instance, although the growth contained spindle-shaped cells, and grew like a fungus from the skin, it did not show the blood-cysts nor the multiple nodosities which were present in the three cases which I have narrated. It is possible, therefore, that its non-recurrence is to be explained by the circumstance that it was not really of the same nature as the others.

If we admit the clinical convenience of placing the fibroid recurrents of the skin in a group by themselves, we shall have to constitute another group of these tumors of similar structure, but much more fibrous, which develop in deeper parts. These are much harder. They are often found attached to the periosteum of bones or to deep fascia. Most of the cases adduced by Paget, in his *Lectures* (page 600, 3d edition), are of this class. We should also have to describe another group, in which hard fibrous tumors developed deeply, were of very slow growth, and tended to unsymmetrical multiplicity. Of these, I have described some remarkable examples in a recent number of the *Annals of Surgery*.

NOTE.—Of nearly all the cases which I have mentioned in this paper, I possess good colored drawings, which help very materially toward the realization of their features of similarity. These I shall, at any time, have great pleasure in showing to any one interested in them.

(To be concluded.)

CERTAIN CASES OF PERIODIC DISEASE OF THE CONJUNCTIVA ALLIED TO HAY FEVER.

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THERE have come under my notice four cases of a periodic affection of the conjunctiva of the eye, which did not correspond to any of the types of disease described in ophthalmic literature. They were all as rebellious to treatment as they seemed puzzling in their nature. At last their periodicity—lasting only, as they did, during the warm season—made it appear probable to me that they represented the pathological entity known as hay fever, localized, however, entirely or principally in the conjunctiva.

It is true we know neither the pathogenesis nor the real origin of hay fever, but we use this term in a very definite way to characterize certain irritative symptoms which return in certain susceptible individuals during some of the warm months of every year.

This irritation pertains to the respiratory tract in regular hay fever, but very frequently involves likewise the conjunctiva. We further know that this irritation is either favored or retarded by the locality in which the individual spends the summer months. This climatic test gave a similar positive result in two of my patients who availed themselves of it.

The lesions which were developed during the latter course of the disease in the palpebral conjunctiva of two (or perhaps three) of my patients,

resembled, so far as the unaided eye could decide, the hypertrophy of the ocular conjunctiva occurring in that rare disease known as "spring catarrh" (Fruehjahrs-catarrh of Saemisch). The only description of this disease in the English literature with which I am acquainted, is that of Burnett (*Archives of Ophthalmology*, vol. x. p. 414), under the name "circumcorneal hypertrophy of the conjunctiva."

In this spring catarrh the conjunctiva forms prominences around the cornea in the shape of pale, grayish, firm tumors of a gelatinous appearance, sometimes coalescing into an incomplete circumcorneal ring. This disease, too, returns annually in the spring or early summer, and keeps the eye in a state of irritability until fall, when all symptoms cease, and even the conjunctival lesions disappear, or at least subside.

Spring catarrh has proved about as intractable to treatment as the disease I am now describing. Moreover, Reymond, Vetsch, and Burnett have described lesions of the conjunctiva of the lids accompanying spring catarrh, in some instances, not unlike those I have seen in my cases. Since in all four of my cases the conjunctiva of the eyeball was not involved, they were certainly not instances of spring catarrh. Yet the periodicity of these two diseases, and the resemblance in their lesions, could not but deserve special mention.

The four patients to whom I refer began complaining between May and July each year, and continued to suffer until cold weather set in. Two of them learned that a prolonged sojourn in other parts of the country stopped their annoyance, and this annual cure was not interfered with by a return to Chicago before the end of the warm weather. Three of these patients have never had any other hay fever symptoms; one of them has gradually developed some irritation of other parts of the respiratory tract not sufficiently characteristic to be called hay fever, were it not for its periodicity.

The symptoms were continuous slight discomfort in the form of burning, itching, or fulness of the eyes, increasing decidedly on using the eyes for work, so as to cut short any attempts at prolonged reading or writing. One boy, in whom this continuous irritation, as well as the asthenopia on using the eyes, was slight, had attacks of sharp pain in the eye almost every afternoon, lasting a couple of hours, and terminating abruptly with the removal of strings of tenacious mucus from the conjunctival sac. One patient had none, or but the most insignificant conjunctival secretion; the others had stringy mucus, or thick pus, forming on the surface of the conjunctiva. In one instance the conjunctiva appeared nearly normal, although slightly hyperæmic. In two cases the conjunctiva appeared to be in a state of moderate chronic catarrhal inflammation. In one of these, however, the condition changed during the third year, resembling now the somewhat velvety surface of a follicular (not granular) conjunctivitis, to become

normal again during the following winter. During the fourth attack of this patient the peculiar lesions above referred to were found nearly as well developed as in the conjunctiva of another individual whom I saw during his twentieth attack. While the conjunctiva of the lower lid was simply congested and somewhat relaxed and succulent, so to speak, the conjunctiva of the upper lid was not smooth, but studded with granules—or one might almost say papules—about the size of a pin's head, or a little larger; flattened, not absolutely opaque, although hardly translucent, and of a yellowish-gray color.

The membrane was but moderately injected. The appearance was unlike that of either papillary trachoma, or of the sago granules of that disease. It reminded me somewhat of amylaceous degeneration. During the present cold weather these conjunctival membranes are again normal in appearance. The view which I at first entertained, that some of these patients had simply chronic catarrhal conjunctivitis, was soon disproved by the inefficiency of the treatment. The annual return of the trouble has besides disposed of that view.

The following is the essential history of the cases:

Case I.—I. U., a boy of nine years of age, was seen on the 28th of May, 1880. He had been in fair health, but always presented an unhealthy yellowish complexion, without any evidence of icterus. There existed very slight choreiform movements of the neck and shoulders. His tongue was always furred; yet his appetite and digestion were said to be good. Since four years of age he had complained of his eyes every summer, until fall. Last year, about the end of July, a trip to the seashore restored his comfort. During the winter he had never complained of his eyes. About the middle of May his eyes began troubling him again. He had hardly any annoyance during the greater part of the day, and but little discomfort on reading; but about four o'clock a burning pain set in, causing him to close the eyes, and often making him cry. About two hours later he could rub out some "strings," and in a few minutes was again comfortable. These strings I examined microscopically, a few days later, and found them to consist of mucus, some epithelial cells, and very few leucocytes, besides numerous fine granules, which I could not then identify as parasites. During the attack his eyes were said to be reddened.

The conjunctiva I found to be slightly congested in the lower lids, and more so in the upper lids. On the right upper lid the surface was somewhat velvety, as in chronic follicular catarrh. This was the appearance during the free interval. I was never able to see the boy during an attack of pain, although I called at the house repeatedly in the afternoon; for the attacks did not occur every day, especially after the treatment was begun. (My present recollection is that they were more likely to come on during hot weather.) I ordered the use of a concentrated solution of boracic acid to be dropped into the conjunctival sac a few times daily, and especially during the attacks. The nose was said to be somewhat "stuffy," although the child did not complain of it. There certainly were no spells of sneezing or other hay fever symptoms, though some chronic pharyngitis existed. Suspecting vaguely a nasal origin of

the disease, I ordered a nasal douche in the evening and before the expected attack.

The boy claimed during the next few days that the nasal douche relieved him, although his nose hardly seemed to trouble him. At any rate, the attacks were less frequent and perhaps less severe. The conjunctival membrane appeared less congested during the next few weeks.

I was called again on the 10th of July. After comparative comfort, during the month of June, the trouble returned in July, more severely than before. The conjunctiva was more congested and more velvety, and in the fornix there appeared sago-like granules, with a central point of injection. My notes do not describe the condition fully, but I remember that the appearance was new to me, and different from the granules of trachoma. I treated him for several days with a weak solution of nitrate of silver, and had him insert iodoform bougies in the nares. The improvement which I obtained during the next few days did not last, however. The following week I gave him daily ten grains of quinine, in three divided doses, again with some temporary benefit. I did not see him again, but learned from the parents that no permanent relief was obtained. They took him to the seashore, in August, with immediate satisfactory result.

The child was seen in August, 1884, by Dr. E. J. Kuh, to whom I am indebted for the following notes: The eye trouble had returned every year during the months of May to September. Dr. Kuh did not examine the conjunctiva accurately, merely noting its congestion, since he was consulted for other reasons. The chorea still existed; there were also occasional polyuria and incontinence of urine, and he noticed a systolic fremitus on listening to the heart. The child had frequent "colds," accompanied by cough and sneezing fits. The vascular plexus over the inferior turbinated bones was enlarged at times on both sides. Touching this region with a probe produced considerable irritation of the conjunctiva. Dr. Kuh considered the case as one of reflex neurosis, starting from the vascular swelling in the nose, and proposed destroying the vessels by the galvanocautery. This operation the parents refused. Dr. Kuh was inclined to consider the trouble as hay fever, but the case was not typical enough to make the diagnosis certain.

Case II.—Dr. M. M., a prominent physician, of middle age, began complaining of his eyes in the summer of 1882. His health was, and has since been, good. For many years he has had a myopia of 6 D., corrected by glasses, which has never annoyed him in any manner. At that time the conjunctiva showed the usual condition of slight chronic catarrh. The secretion was always moderate. He complained of slight burning in the eyes, usually made worse by reading. Boracic acid collyrium allayed his annoyance for a while, but not permanently. On ordering a solution of sulphate of zinc, I found his conjunctiva very sensitive to a one-half per cent. solution, and had to reduce its strength to one grain per ounce, but without permanent benefit. A careful ophthalmoscopic and dioptric examination showed no other cause for his discomfort. He attributed the irritation to dust, but I never found him quite free from it, even on rainy days. The trouble ceased gradually during the fall.

In 1883 it returned again, about the end of May. On changing his open buggy for a closed coupé, in order to protect himself against dust, he thought he had eliminated the cause, but only for a short time. The

irritation was more severe than during the previous year, and sometimes made it difficult for him to keep his eyes open. Reading was often, but not always, interfered with, but when kept up in the evening it did not make the eyes more irritable than they had been. Nothing was found objectively but a slight catarrhal condition of the conjunctiva. There was no evidence of obstruction of the lachrymal duct. Collyria of acetate of lead and applications of nitrate of silver, one to two grains per ounce, proved useless. The eye was again intolerant to any strong application. Acting on the suggestion of Noyes, who had used very weak washes of nitrate of silver in a peculiar persistent form of conjunctivitis, seen by him often in New York City, and attributed by him to the influence of dust, I directed the patient to drop in a solution of nitrate of silver, one-eighth grain per ounce. This gave him more satisfaction than any previous treatment, but did not cure him. On going to Lake Minnetonka, in August, he found immediate and permanent relief.

In 1884 the same history repeated itself. The conjunctiva now showed enlarged follicles in the fornix, resembling the condition of follicular catarrh. Dr. M. again went to Lake Minnetonka, at the end of July, with the most satisfactory result to his eyes. Returning in September, he noticed very little irritation during that month in this city. During the winter I examined the eyes repeatedly, and found the conjunctiva perfectly normal, with the exception of a trifling passive hyperæmia.

The summer of 1885 was, if anything, more disagreeable to Dr. M. than previous years: there was more secretion. Examining him in June, I noticed flat elevations on the conjunctiva over the tarsus of both upper lids; the membrane was intensely reddened, while the elevations were paler and more yellowish, and shaded off gradually into the surrounding mucous membrane; their diameter was about one millimetre; the mucus adhered to the conjunctiva in the form of strings. Weak nitrate of silver solutions gave some relief, but had no great influence. The sulphate of copper stick was better tolerated than I expected, but accomplished no more than did the silver solutions. Cocaine, in one and two per cent. solution, relieved for some hours, but neither so completely, nor for a sufficient length of time, to induce Dr. M. to use it except during the days of most intense discomfort. I examined the nose thoroughly, but found no more swelling of the vascular plexus or redness of the mucous membrane than most persons present in this climate; there were absolutely no nasal symptoms. Irritation of the turbinated bone with a probe produced, however, decided discomfort in the eyes. But, on the other hand, the thorough use of cocaine in the nose did not relieve the cutaneous irritation of the eye. Dr. M. started early in July on a trip to New Mexico and Colorado, and returned in August. Since leaving the city he has had no further trouble, nor did this return later, perhaps on account of the cool summer. His conjunctiva is now perfectly normal, and the elevations have disappeared completely.

CASE III.—Mr. D. W., æt. thirty-two years has had sore eyes every summer since his twelfth year. The attacks begin about July and end toward September. Their severity varied considerably in different years, being mitigated by cooler weather. He had been treated by oculists during previous years without much benefit. He complained of steady burning and inability to use the eyes for any length of

time, with occasional severe pain during the day, but not at any regular time. There had been all summer a copious purulent discharge from the eyes. I saw him on the 15th of August, 1885. The lids were very little thickened, and at a distance the eyes seemed almost normal. On everting the lids the conjunctiva was found reddened and uniformly thickened. The surface was smooth on the lower lid, but on the upper lids there existed flat prominences, one to two millimetres large, not distinct from the rest of the mucous membrane—that is to say, not strictly circumscribed, but diffuse in outline. They were paler and more yellowish than the rest of the surface, which was markedly injected. They did not extend into the fornix, but spread all over the tarsal portion. The surface was covered with tenacious pus. There was no subjective complaint or objective anomaly of the nose. There was a manifest hypermetropia of 0.75 D. in the right eye and 4 D. in the left eye, which the gentleman assured me had never troubled him during the winter.

Nitrate of silver solution, in the strength of one-fifth per cent., considerably relieved the burning, but did not alter the condition of the conjunctiva. The spells of pain became less frequent during the following week, but hardly less severe. The instillation of castor oil at night was of no particular service. Cocaine solutions relieved his pain, but proved only palliative. One week's interruption of the treatment at the end of August allowed the trouble to return to nearly its former severity. As I could not promise him any cure during the present summer, he ceased further treatment. Since the cold weather has set in he has been free from all ocular annoyance. I have not had an opportunity to examine his eyes since that time.

Case IV.—Mr. H. B., of Dakota, æt. thirty-four years, had normal eyes and good health until the summer of 1884. During the winter following he was again free from complaint, but with the beginning of warm weather in 1885 the same condition returned. He has slight burning and discomfort in the eyes continuously, but hardly sufficient to annoy him. On reading, this irritation increases, however, so as to force him to stop within a few minutes. At such times the eyes water freely. There is, also, a steady frontal headache, not severe enough to keep his attention directed to it continuously.

When seen August 26, 1885, the lids and surrounding skin appeared somewhat puffy, and of a brownish discoloration, such as is met with occasionally in acute catarrh or hay fever. There was no indication of obstruction of the nasal duct. The conjunctiva was almost normal, a very slight redness and minimal mucous secretion indicating the least possible degree of catarrhal change. Vision, refraction, and accommodation were normal. He admitted having some nasal catarrh, but inspection showed only moderate swelling of the nasal mucous membrane and slight secretion. The probe touching the nasal membrane produced moderate conjunctival irritation and slight secretion. There was no watery discharge from the nose. His frontal headache made me suspect a catarrh of the frontal sinus. But I could get no evidence of it. Percussion of the forehead and temples was not painful. The nasal douche was used for a few days on the strength of this suspicion, but afforded no relief to the eyes. Nitrate of silver solution applied to the conjunctiva for a week was of no more benefit than the treatment of the nose by means of cocaine spray and insufflation of dilute nitrate of silver

powder. In mentioning the negative effect of these remedies, I do so bearing in mind numerous cases of catarrhal trouble of the conjunctiva, lachrymal duct, and nasal passages, in which similar treatment proved effectually curative. The patient remained in the city ten days without any improvement beyond a lessening of the puffy condition of the lids. Since I suspected the ocular symptoms and the headache to be a so-called "reflex" disturbance of nasal origin, I suggested to him the galvanocaustic treatment of the nose as a harmless, and possibly useful operation. He preferred to defer this for personal reasons. I advised him, on his departure, to take iodide of potassium internally, and to paint tincture of iodine over the brows on account of its effect on the nose, of which I had previously seen conclusive instances. I have not heard again from him.

In all these instances I have referred mainly to the positive symptoms. In no case did I omit a careful and full examination of the eyes and minute inquiry into the general health as to any other cause of these summer attacks, but only with negative result. I can, therefore, give no further information as to the nature of this hitherto undescribed disease.

CENTRAL MUSIC HALL, CHICAGO.

A STUDY OF DIAPHRAGMATIC PLEURISY.

BY FRANK DONALDSON, JR., B.A., M.D.,

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A CASE of diaphragmatic pleurisy which came under the writer's observation, some months since, attracted his attention to this very rare disease, and forms the basis of this study.

Diaphragmatic pleurisy seems to have been known to the ancients in a general way. They describe it under many different names, as phrenitis, paraphrenitis, diaphragmitis, etc. Under these names they included several distinct affections, which had, however, the common symptoms, fever and delirium. Hippocrates[1] used the term phrenitis, but as designating a febrile state only, and not as indicating any disease of the diaphragm itself.

Oelguinetus and Tralian, however, seem to have known true phrenitis or inflammation of the diaphragm, for they speak of the distinct type of the respiratory movements in the latter affection—a type which they failed to notice in ordinary phrenitis, or delirium with fever.

The term paraphrenitis (first used by Rufus, of Ephesus,[2] a contemporary of Galen) had a more definite signification, and was applied by

[1] The Works of Hippocrates, by Francis Adams, Sydenham Society, 1849, vol. i. p. 418.

[2] Rufus, of Ephesus, De Corpor. Human., lib. i.

him to actual or supposed inflammation of the diaphragm where the brain was affected symptomatically. This author states that the partition which divided the organs of the chest from those of the abdomen was called *διαθραγμα* or *θρενες* (the soul), the ancients supposing the seat of the soul to be in the diaphragm, and he goes on to say, that as the term phrenitis was used to describe several distinct affections, he proposes that inflammation of the diaphragm should be designated as paraphrenitis, simply to prevent confusion. Galen[1] also knew diaphragmitis as a distinct affection, and in a chapter entitled "Phrenitis from inflammation of the brain, and that from inflammation of the *diaphragm*," describes the delirium which follows inflammation of the brain, of the lungs, and of the pleura, and remarks that inflammation of no other organ causes such continued delirium as that of the diaphragm. This writer, however, placed the seat of the inflammation in the *muscular* structure of this partition, and not in its serous covering, though he none the less accurately described the peculiar character of the respiration, and the retraction of the hypochondriac region, always present in this malady.

Wolffius[2] (1661) also recognized this disease as a distinct affection, and gives its symptoms in more or less detail. Following the last writer, Boerhaave[3] gives a complete description of diaphragmatic pleurisy, under the name paraphrenitis, recognizing it as an inflammation of the serous covering, viz.: "Si morbus pleuritidi similis occupat eam membranæ pleuræ partem quæ diaphragma ambit, vel et ipsum septum medium; paraphrenitidem appellant."

Huxam[4] goes further, and describes both primitive and secondary inflammation of the diaphragm. Morgagni[5] gives the case of a man who having escaped inflammation of the lungs, was taken with "a pleuro-peripneumony, which was succeeded by a phrenitis, and even by a paraphrenitis," and explains at length the exact sense in which the latter term is used by him, and declares that he does not wish to be understood as saying that the delirium (phrenitis) in this case necessarily depended on inflammation of the diaphragm. Sepulchretus[6] gives two observations of inflammation of the diaphragm, one from Blasius[7] and the other from Laelius à Fronté. The latter saw the diaphragm actually suppurated, and the former greatly inflamed after a phrenitis. Finally, Schneider[8] wrote quite fully on inflammatory affections of the diaphragm. With this author our history of the subject is brought down to the

[1] De Locis affectis, lib. v. cap. v.
[2] De Septi Transversi Inflammatione; Argentorati, 1661.
[3] Aphor. de Cognos. et Curand. Morb, 1709.
[4] Essay of Fevers, 1747.
[5] De Sedibus et Causis Morborum. Translation of Dr. John Alexander, London, 1749, book I. letter vii. art. 14, p. 139.
[6] Anat. Practica ex Cadav. Morbo denati. Edited by Theo. Boult, Geneva, 1679.
[7] Misc. Anatomica, etc, liber I. sec. i. obs. i., Amstelodami, 1673.
[8] De Inflam. Diaphragmatis, Wittenberg, 1665.

eighteenth century. During this hundred years our practical knowledge of diaphragmatic pleurisy cannot be said to have increased, though an enormous amount was written on the subject. I find, after careful search, some twenty-two distinct treatises of more or less scientific value written between 1700 and 1800, but I shall allude only to the more important of these monographs. Selle[1] seems to have been the first to use the term *diaphragmitis*, and, moreover, he gives the signs and symptoms of the disease with unusual clearness. Stoll[2] gives not only the general symptoms of the disease, but two cases thereof, observed by himself, with the post-mortem appearances. Lieutaud,[3] writing in 1767, gives three cases of diaphragmatic pleurisy, taken from De Haen,[4] and Cullen[5] directs particular attention to the disease, as involving not the muscle, but the pleura which covers it.

It was not, however, until the early part of the present century, after Bichat's researches, that inflammation of the serous coverings in general, and the diaphragmatic pleura in particular, attracted general attention to the part played by the latter in the causation of the disease before us. Portal[6] wrote that inflammation of the diaphragmatic pleura was by no means so rare a disease as was formerly supposed. Pierre Frank,[7] though he gives a number of the characteristic symptoms of this affection, confounds it with pleurisy proper and peritonitis. Roy,[8] in describing the risus sardonicus, declares it to be a constant symptom of inflammation of the diaphragmatic pleura. Laennec,[9] in the first edition of his work, describes inflammation of the diaphragm under the general head of circumscribed pleurisies. He declares the former to be a very rare and grave disease, but gives no definite diagnostic signs. Buffinton,[10] again, gives the symptoms of this disease, and says the malady is always fatal. This brings us to Andral,[11] who was the first to publish definite observations under the name of diaphragmatic pleurisy, and to show that the affection might be primary or secondary. He gives five cases in his *Clinique Médicale*,[12] and divides the symptoms into four groups, viz., 1st, the pain, increased by pressure, along the cartilaginous border of the false ribs, and extending down and outward; 2d, the almost complete immobility of the diaphragm; 3d, the expression of the countenance; and, 4th, the constant orthopnœa, with forward inclination of the body. To Andral must be given the credit of giving this disease, with its signs and symptoms, a definite place in medical literature. A number of authors after Andral wrote on this subject with more or less fulness

[1] Rudimenta Pyretologie, p. 170.
[2] Radio Medendi, 1777, p. 345.
[3] Historia Anat Medica, vol. i. p. 95.
[4] Radio Meden part I p. 84, and part IX. p. 17.
[5] Elements of Practical Medicine, 1784
[6] Anatomie Médicale, 1803, vol. iv. p. 233.
[7] De Cur. hominum Morbis Epitome, 1812, lib. ii. p. 179.
[8] Traité sur le rire, Paris, 1814.
[9] Traité de l'auscultation Médiate, Paris, 1819.
[10] Paris Thesis, 1822.
[11] Arch. de Médecine, October, 1823.
[12] Clinique Médicale, Paris, 1824, vol. i. p. 480.

and accuracy, Joseph Frank[1] more particularly giving much space to it. He adopted, however, the idea and nomenclature of the ancients, in spite of his acquaintance with Andral's advanced treatise. Mehliss[2] also wrote at some length on inflammatory affections of the diaphragm, but it remained for Gueneau de Mussy,[3] in 1853, to write the first elaborate monograph on diaphragmatic pleurisy, and the great importance of this work will be seen further on in our paper. I find a number of other articles on the subject, published from 1853 to the present date, reference to which will be found in the text.

So much for the history of our subject, and before treating it more in detail, I give briefly my own case, which I wish to put on record:

The patient, a man of about forty-one years, was brought to our office, in the words of his physician, "for a diagnosis." He had been sick for nine weeks; his illness had begun with a chill, followed by intense pain referred to the lower intercostal region, more particularly on the right side over the liver, with great and increasing difficulty of respiration. He had been, almost from the first, unable to lie down, sitting always with the body bent forward, and his hands pressed to his side to prevent any extra motion. His cough was incessant and dry, his dyspnœa and anxiety of countenance, even at this time, painful to behold. Though I had never seen a case of diaphragmatic pleurisy, I was led to suggest that the trouble was with this structure even before making a careful examination, for I knew of nothing which could produce the peculiar distinctive respiration, found in this patient, except some trouble of the diaphragm.

On examination, the abdomen was found retracted, the diaphragm almost immobile, and the respiration entirely costal. There were points anteriorly and posteriorly painful to pressure. On percussion, some dulness was observed around the lower part of the chest, especially on the right side behind. On auscultation, pleural friction sounds were heard on the left side only; on the right, feeble respiratory murmur, with subcrepitant râles in a circumscribed space at the base of the lung, the inflammation having extended from the diaphragm to the lung and set up a localized pneumonia.

Such being the signs and symptoms in the case, a diagnosis of diaphragmatic pleurisy of tubercular origin, with slight effusion on the right side, was made by my father, Prof. Donaldson. It only remains to say that the patient grew gradually worse, the spot of pneumonia was not resolved, and his lung began to break down. Owing to the great pain that any movement of the diaphragm gave him, he was able to expectorate to a limited extent only, which increased his sufferings and hastened his death.

When we consider the structure and position of the diaphragm, the number of vessels and nerves which pass through it, the organs to which it is adjacent, and the three serous coverings with which it is con-

[1] Pathologie Médicale, vol. iv. p. 371.
[2] Anat. du Diaphragm, chez l'homme, 1845.
[3] Archives de Médecine, 1853–54.

nected, its pathological importance is apparent, and it is a matter of surprise that so little attention has been given it as the seat of disease.

Primary inflammation of the musculo-tendinous structure of the diaphragm is very rare, though it occurs in the course of acute rheumatism, in penetrating wounds, and in injuries of the chest. Inflammation of the diaphragmatic pleura is much more frequent, and is caused by pleurisy, pneumonia, hepatitis and peritonitis, wounds of the chest and abdomen, fracture of the lower ribs, blows at the base of the chest, currents of cold air on the perspiring body, immoderate laughter, continued crying and weeping, the suppression of rheumatism (Patterson,[1] Portal[2]), the healing of old sores (Aaskou,[3] Boisseau,[4] Selle[5]). Hildebrand[6] considers tight lacing and corsets a cause of this disease.

Diaphragmatic pleurisy would seem to be most frequent in the adult and in women. It is rare in children, though I find cases reported respectively by Graves,[7] Hildebrand,[8] and one by Jacubusch[9] of an infant but five months old. Diaphragmatic pleurisy is more often unilateral, both sides, however, being affected indifferently. Just here it should be stated that beside the primary inflammation of the diaphragmatic pleura spoken of above, there is a form of so-called *acute benign* diaphragmatic pleurisy, first written of at length by Bucquoy,[10] the tendency of which is always toward cure, and of which I shall treat fully later on.

Secondary inflammation of the diaphragm, though generally overlooked, is none the less frequent. It is most often caused by tuberculosis, and is invariably fatal[11] (Andral,[12] Peter,[13] Howe[14]). It occurs also in those recovering from acute rheumatism (Patterson, Portal, Dubois,[15] Peter[16]). It is usually double and not necessarily fatal. General or partial peritonitis often lights up a secondary inflammation of the diaphragm (Peter,[17] Cuffer,[18] Foix[19]); and Herndon[20] relates a case of perforation of the diaphragm following severe peritonitis. Pitres[21] and Lancereaux[22] were the first to call attention to puerperal peritonitis as a cause of diaphragmatic pleurisy; this form of the malady is always fatal. Charrier,[23] also, in relating the epidemic of puerperal peritonitis observed at the Maternity Hospital, remarks on the frequent coexistence, in such

1 Trans. of Med Soc. of London, vol. v. No. 32.
2 Acta Soc. Med., Havana, t. i. p. 205, 1777.
3 Nosographie Organ, t x. p. 620.
4 Institutiones Médicale, t. iii. p. 267.
5 Loc. cit.
6 Journ. f. Kinderkrankheiten, 1854, vol. xxii. p. 412.
7 Clinical Medicine, 1863, vol. ii.
8 Loc. cit.
9 Berlin. klin. Wochenschr., Oct. 8, 1883.
10 Leçons Clinique, Paris, 1873.
11 Chauffaud in Hermil. Paris Thesis, 1879, p. 98.
12 Loc. cit.
13 Gaz. des Hôp., 1875, p, 1065.
14 Med. Journ. and Gazette, Feb. 1857.
15 Paris Thesis, 1876.
16 Arch. Général. de Méd., 1871, p. 343.
17 Union Médicale, 1856, p. 562.
18 Bull. de la Soc. Anat., 1874, p. 197.
19 Paris Thesis,1874.
20 Wien. med. Presse, 1869, x. p. 990.
21 Bull. de la Soc. Anat., 1875.
22 Pro. Méd. Francaise et etrangére, 1879, p. 474.
23 Paris Thesis, 1855.

cases, of inflammation of the diaphragmatic pleura. Hervieux,[1] Hilton Fagge,[2] Foix,[3] Laroyenne,[4] Coyne,[5] and others, all remark the frequent production of this disease by puerperal peritonitis, agreeing that the inflammatory products are usually carried by means of the lymph channels, and that the pleurisy is caused directly by a peritoneal abscess which breaks through the diaphragm.

As to the so-called epidemics of diaphragmatic pleurisy observed by Sagar in 1770, and by Boerhens in 1819, it may be said that the epidemics in question were most probably typhoid fever with peritonitis, followed by inflammation of the diaphragmatic pleura. Finally cysts, abscesses, and cancer of the abdominal viscera are often the direct cause of a diaphragmatic pleurisy.

As to the frequency of this disease, it must be confessed that it is not very rare. Laurence, Andral, Peter, and de Mussy think it by no means uncommon. It is impossible to give the exact number of cases on record; speaking generally, it is less than one hundred. Doubtless its apparent rarity arises from a failure on the part of physicians to recognize the disease, or, when diagnosticated, to put on record.

Symptomatology.—The onset of diaphragmatic pleurisy is variable. It is usually ushered in by a chill of greater or less violence, followed by fever and sweat. Secondary pleurisy, arising in the course of acute or chronic disease, is marked by an increase of the fever or by a distinct chill; but it is the pain and the characteristic symptoms which follow, that attract attention. In perforation of the diaphragm by bursting of an abscess of the liver, for instance, violent pain and dyspnœa are the prominent symptoms. Intense pain in the side and constriction of the lower part of the chest, soon follow the chill. The pains of diaphragmatic pleurisy are characteristic, and are to be referred to the terminal filaments of the phrenic nerve; they are what Hermil calls "douleurs par propagation."

If we call to mind the anatomy and distribution of the phrenic nerve, we can explain many of the peculiar symptoms found in inflammation of the diaphragmatic pleura. It arises from the third and fourth cervical nerves, receiving a branch from the fifth, and runs through the chest to the diaphragm, where it divides into branches which pierce that muscle separately, and are distributed to its upper and under surface. The nerve, besides its connection with the nerves of the neck and shoulder, supplies filaments to the pericardium and pleura; near the chest it is joined by a filament from the sympathetic and by one from the fifth and sixth cervical nerves. It is also connected with the solar and hepatic plexuses, and gives off filaments to the peritoneum and the suprarenal capsules.

[1] Traité clin. et prac. de mal. puerperale, Paris, 1870.
[2] Guy's Hospital Reports, 1879, vol. xix.
[3] Loc. cit.
[4] Lyons Méd., 1877.
[5] Bull. Méd. du Nord, 1877.

The pains of diaphragmatic pleurisy extend, as might be expected, over a large surface—over the whole hypochondriac region and over both flanks to the inferior dorsal region behind, following the line of the costal insertions of the diaphragm, and often along the border of the sternum and under the lower insertion of the sterno-cleido-mastoid muscle, and over the shoulder and neck. The pains may be spontaneous, but are always evoked by pressure or by increased respiratory movements, hiccough, vomiting, etc. According to de Mussy,[1] the favorite seats of pain on pressure are over the epigastrium, at the points of insertion of the tendons of the diaphragm; in the last intercostal space behind, near the spine; along the course of the phrenic nerve; and, finally, at what he calls "*le bouton diaphragmatique*," where the pain is always especially great. De Mussy localizes this spot at a point one or two fingers' breadth from the middle line, on a level with the tenth rib, or at the intersection of a line drawn from the osseous part of the tenth rib and one drawn along the border of the sternum. He explains the greater pain at this point by the greater play of the rib and consequent friction against the inflamed nerve.

The pressure of the liver and spleen on the inflamed pleura serves to explain the pain felt over these organs. The pain along the trunk of the phrenic nerve, referred to above, is rarely spontaneous, but is always evoked by pressure, and especially is this so at the point where the nerve runs under and between the inferior division of the sterno-cleido-mastoid muscle. De Mussy gives a case where great pain was spontaneous at this point. This hypersensibility of the phrenic nerve is explained by its partaking of the inflammation of the diaphragm. Pressure in the intercostal spaces also gives rise to pain. The pains of propagation—the reflex pains—run along the sides, downward even to the iliac fossa, but are usually more intense in the upper part of the body. They are sometimes felt with special intensity in those muscles connected by their nerves with the cervical and brachial plexuses. Supraclavicular pains are generally severe, as well as those in the shoulders and over the scapula and the trapezius muscle generally, the nerves of this entire region being connected through the fourth cervical with the phrenic, as we have stated. The pain referred to the axillary region comes from the connection of the phrenic with the internal cutaneous and the brachial plexus.

Hypersensibility of the phrenic nerve is also sometimes observed in inflammation of the costo-pulmonary pleura and in pericarditis; and it sometimes precedes acute inflammation of these organs and of the diaphragm. Absence of spontaneous and provoked pain at the various parts mentioned was noticed by Graves;[2] and, indeed, in his case pressure upon the painful spots relieved the pain. It seems that in cases of

[1] Arch. Général. de Médecine, 1853, vol. ii. p. 274. [2] Loc. cit.

double diaphragmatic pleurisy the pain is always greater on one side than the other. As to the frequency of pain in any given place, that in the hypochondriac region is most often present. In 40 cases given by Hermil, visceral pain was present in 15 cases, special pain at the "bouton diaphragmatique" in 9 cases, pain under the sterno-cleido-mastoid muscle in 20 cases, supraclavicular pains in 7 cases, in shoulder 11 cases, and pains in the axillary region in 2 cases.

The attitude of a person with diaphragmatic pleurisy is very characteristic: The dorsal position being impossible, the body is bent forward, and the hands are applied to the sides in order to immobilize the diaphragm as much as possible. The expression is one of great anxiety and suffering; this peculiar pinched, painful look is more marked where there is a coexistent peritonitis. The convulsive movement of the muscles of the face and mouth, the *risus sardonicus*, is often present, though it is not, of course, as was formerly supposed, a diagnostic symptom of this disease. The most distinctive and prominent symptom in diaphragmatic pleurisy is the frequency and shallowness of the respiratory movements. They are short, aborted, and accompanied with great pain and discomfort to the patient. Respiration is entirely costal and limited, even then, to the upper part of the chest; and, indeed, it may be limited to one side, as in a case given by de Mussy. The number of respirations is, of course, greatly increased, running as high as 80 or 100 (Hayden[1] and Graves[2]). The great trouble and pain in breathing arise, of course, from the interruption in the play of the inflamed diaphragm, kept immobile either by the patient himself, or by a complete or partial paralysis of the structure itself. Paralysis of the diaphragm in such cases is caused directly by the inflamed condition of its pleural surface (a condition somewhat akin to the paralysis of the palate following diphtheria, Stokes),[3] or by a compression of the phrenic nerve by the fibrinous exudation. Again, although there may be no paralysis as such, the effusion may be so large as greatly to embarrass diaphragmatic action. The immobility of the diaphragm in these cases, from whatever cause, is an interesting and instructive symptom, and is the direct cause of the retraction of the hypochondriac region invariably seen in diaphragmatic pleurisy. This sign was held by Galen and the ancients as pathognomonic of this disease. Selle[4] remarks it, and Van Swieten[5] speaks of the *quiescente abdomine*. The diaphragm being to a great extent immovable, it forms a more or less elastic division between the chest and abdomen, the movements of which are in opposition to each other, and are exactly the reverse of those of normal respiration. The

[1] Dublin Quarterly Journ., 1871, vol. lii.
[2] Dublin Quarterly Journ., 1836
[3] Loc. cit.
[4] Loc. cit.
[5] Commentaria in Aphor. Boerhaave, vol. ix., 1771.

paralyzed diaphragm is an inert partition, which follows the respiratory movements instead of directing them.

Paralysis of the diaphragm, however, is rarely complete and usually unilateral, and in most cases the immobility of the diaphragm is due to the pain caused by any superfluous movement. Of course, the effusion may be so great as to cause not only a paralysis, but a complete sagging of the diaphragm, and great displacement of all the abdominal organs, as in a case of pyopneumothorax seen by the author.

Respiration being so much impeded, auscultation gives very negative results. Great enfeeblement of the respiratory murmur on the affected side, a few subcrepitant râles at the base of the lung from its imperfect expansion and involvement in the inflammation of the adjacent pleura, and pleural friction sounds over the diaphragmatic area, are the only signs present to the ear. Laennec declared ægophony to be present in diaphragmatic pleurisy on theoretical grounds, and the experience of Skoda would seem to confirm the statement. More or less dulness immediately around and above the diaphragm is present on percussion.

The cough is frequent, dry, and exceedingly painful; the expectoration slight and thin. Where the inflammation extends to the costo-pulmonary pleura, we have, in addition, all the signs of this affection. In cases of diaphragmatic pleurisy with effusion, de Mussy gives, as an important symptom, the *lowering* of the twelfth rib, so that its anterior end is lower than that of the twelfth rib on the opposite side. This sign is given by Chauffaud in a case quoted by Hermil.[1] In cases of effusion there may be slightly increased Skodaic resonance on percussion over the attachments of the diaphragm.

Hiccough is often a distressing symptom in this malady, and was at one time considered diagnostic. It has no absolute value, however, for it is also present in circumscribed peritonitis of the superior part of the abdomen. Sometimes it is present from the very beginning in inflammation of the diaphragm; Vergely[2] gives such a case, which was rapidly fatal. Nausea and vomiting, too, are often extreme, and icterus has been noticed in two cases of right diaphragmatic pleurisy by Hermil,[3] and also by Andral[4] and Monod.[5] It is, of course, caused by the extension of the inflammatory process from the diaphragm to the liver.

Dilatation of the stomach has been met with by Peter,[6] who was the first to call attention to it as a complication of this disease, and also by Laporte.[7] It proceeds from an inflammation of the peritoneal covering of the stomach, which later invades the muscular structure of this organ,

[1] Loc. cit., p. 98.
[2] Gaz. des Hôp., 1873.
[3] Loc. cit.
[4] Loc. cit.
[5] Hermil, p. 77.
[6] Clin. Méd., vol. i. p. 400, and Journ. de pract. méd. et Chir., 1874, p. 209.
[7] Paris Thesis, 1869.

causing it to lose more or less of its tonicity, and to be easily distended by gases, etc. Violent pain when a bolus of food passes the œsophagus at its passage through the diaphragm is a symptom sometimes met with in diaphragmatic pleurisy.

Great delirium is often present, though it is not an essential symptom of this disease, as was formerly supposed. That it is present more often in this malady than in costo-pulmonary pleurisy is explained by the greater dyspnœa and want of aëration of the blood. Coma sometimes sets in at once, in which case the disease runs rapidly to a fatal termination. The pulse is small and rapid. The temperature runs usually from 38° to 39° Centigrade, though it rises much higher when the diaphragmatic inflammation is complicated with some other malady.

The course of diaphragmatic pleurisy is variable. In primitive cases the invasion is rapid, the symptoms reaching their greatest intensity quickly, and subsiding in the same manner. Double pleurisy rarely begins as such, one side being affected first. Secondary pleurisy is often complicated by pericarditis, peritonitis, etc., and generally ends fatally. The duration, too, is variable; the acute symptoms are more prolonged than in ordinary pleurisy. The neuralgic pains along the course of the phrenic nerve often continue for a long time, with tenderness over the insertions of the diaphragm.

Diagnosis.—The *diagnosis* of diaphragmatic pleurisy is at best difficult and uncertain; and unless great care be taken, the disease will pass unrecognized. The diagnosis cannot be founded on any one particular sign or symptom. Andral went so far as to say that inflammation of the diaphragm might exist without being announced by any characteristic symptom. De Mussy, however, holds that by careful differentiation we may always arrive at a satisfactory diagnosis. He lays great stress on the value of the "diaphragmatic button," for in no other malady does pressure on this particular point cause pain and dyspnœa. The prominent symptoms, then, to be looked for, are spontaneous and provoked pains in the places and regions already described; immobility of the abdominal walls and the epigastric "hollow;" the peculiar type of respiration; dulness on percussion over the diaphragmatic area; pleural fremitus; absence of respiratory murmur; hiccough; vomiting; pleuritic cough, etc. Nearly all the authors, from Galen to Joseph Frank, have discussed the relation between diaphragmatic pleurisy and pleuritis or meningitis. Morgagni[1] and De Haen[2] give observations to prove that delirium may be entirely absent in the former disease. Joseph Frank[3] goes further, and declares that delirium and sardonic laugh belong no more to this affection than to inflammation of other organs. De Mussy, however, thinks (as do most observers) that delirium is more frequent in diaphrag-

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit.

matic than in costo-pulmonary pleurisy. Again, the absence of the positive signs and symptoms of disease in other and adjacent organs, must be well noted. In cases of greater or less effusion, the diagnosis is less difficult, because of the displacement of the liver and spleen, and of the abdominal organs generally.

Acute diaphragmatic pleurisy is to be differentiated from

I. *Rheumatism of the diaphragm.* Rheumatism of this structure is pyretic, the fever gradually increases for from one to eight hours,[1] and the acute symptoms terminate spontaneously and without complication. It is unaccompanied by pain on percussion at the points described above, the pain being limited to the insertions of the diaphragmatic muscle.[2]

II. *Inflammation of the muscular structure of the diaphragm itself.* Such a diagnosis it is almost impossible to make, though it is to be remembered that the latter is a very rare affection, and results from wounds or abscesses only.

III. *Neuralgia of the diaphragm*, which in itself is often a symptom or result of acute inflammation of the diaphragm. When it is present, we must get at its cause, whether it is dependent on some affection of the heart, or great veins, or on anæmia, hysteria, etc. The absence of fever, however, the side affected, and the intensity of provoked pains will greatly assist in diagnosis.

IV. *Costo-parietal pleurisy.* In this disease, though the pain in the side is as great as in diaphragmatic pleurisy, the seat of the pain is higher up, and, above all, it is accompanied by the well-known percussion and auscultatory signs which are wanting in diaphragmatic pleurisy. Of course, they may and do exist together. Peter[3] gives a case of diaphragmatic pleurisy with encysted effusion in a phthisical patient which was overlooked and mistaken for caseous pneumonia on account of the compression of the lung by the fluid.

V. *Pericarditis.* In pericarditis we sometimes have pain along the course of the phrenic nerve; when such pain is present, however, the heart affection is complicated by some other disease, as in a case recorded by Bouillaud[4] of a pericarditis with purulent pleurisy, involving the diaphragm. De Mussy gives the differential character of the pain in diaphragmatic pleurisy and pericarditis somewhat as follows: Whereas, in the former the principal point of pain is in the "bouton diaphragmatique," on the right side, in the latter it is in the costo-ziphoid angle, on the left side, and immediately under the ziphoid appendage. The dyspnœa, too, is much less in pericarditis, and the physical signs on auscultation and percussion are distinctive, though the pericarditis may be concurrent

[1] Chenevier, Gaz. des Hôp., 1858.
[2] Fernet, N. Dict. de méd. et Chir. prat., Paris, 1869, xi. 344.
[3] Gazette des Hôp., 1875, p. 1065.
[4] Traité Clin. d Rheu. Artic., Paris, 1840.

with an inflammation of the left side of the diaphragm; eight such cases are reported by Hermil.

VI. *Hepatitis.* Right diaphragmatic pleurisy, with icterus, bilious vomiting, and displacement of the liver, may naturally be mistaken for acute hepatitis, which last, however, is a very rare disease with us. In it there are no painful points as in pleurisy, no great dyspnœa, no difficulty in the dorsal position; further, the pain produced by the pressure of the enlarged liver on the diaphragm is distinct from that produced by inflammation of the diaphragm itself.

VII. *Circumscribed peritonitis* of the superior part of the abdomen. A differential diagnosis in this case is often very difficult, for the affections have in common the superficial pain over the abdomen, increased by pressure, the radiating pains extending from below upward even to the shoulder. The pulse in both is very small and frequent, and dyspnœa, hiccough, vomiting, dilatation of the stomach, icterus in cases of perihepatitis, all are sometimes present in peritonitis.

In peritonitis, however, we must seek for those symptoms apparently the least prominent; the functional troubles of each viscus found in peritonitis, and, above all, we must look for the antecedent cause of inflammation of the peritoneum, as cirrhosis, and cancer of the liver, or other organs. Thus, in a case given by Hermil,[1] though the physical signs and symptoms were very misleading, the extreme dyspnœa, with absence of tumefaction on the right side, and of any swelling of the abdomen; and absence of vomiting and icteric taint; the consolidation of the bases of both lungs and the characteristic pains over the bouton diaphragmatique, settled the diagnosis of diaphragmatic inflammation. Furthermore, it would seem that whenever hiccough exists in peritonitis, it is always followed by vomiting (Charrier[2]). Peritonitis according to Foix[3] and Hilton Fagge,[4] is often complicated with diaphragmatic pleurisy, and in such cases the diagnosis is very difficult. Hervieux[5] says that the absence of cough and expectoration, of lung consolidation, and auscultatory signs, is sufficient. Again, it is very difficult to distinguish an encysted supradiaphragmatic effusion from a subdiaphragmatic collection (Donaldson).[6]

Complications and Terminations. — Diaphragmatic pleurisy is usually complicated with pneumonia, costo-pulmonary pleurisy, pericarditis, perihepatitis, and perisplenitic peritonitis. Williams[7] says that peritonitis following diaphragmatic pleurisy is rare, though he gives a case of general peritonitis with inflammation of the under surface of the diaphragm following this disease. Cailliete[8] also gives two cases of fatal

[1] Loc. cit., p. 60.
[2] Paris Thesis, 1855.
[3] Paris Thesis, 1874.
[4] Guy's Hospital Reports, 1873.
[5] Loc. cit.
[6] Pepper's System of Medicine, Art. Pleurisy, p. 563.
[7] Soc. Méd. des Hôp., 1873.
[8] Paris Thesis, 1874.

peritonitis produced by inflammation of the diaphragm. Petit,[1] too, gives a case of perforation of the diaphragm, with fatal peritonitis, following a diaphragmatic pleurisy. The termination in primitive cases is in cure, as will be seen later. In secondary cases it is usually fatal, about one-fourth only of such cases recovering. When an effusion forms, it is either absorbed or becomes purulent, and the patient either lingers a long time, or the collection becomes encysted. In the latter case, it either remains inert, producing no particular bad effects, and attracting no attention, to be found after death from other causes (Graux,[2] Boisseuil[3]); or it ulcerates through the diaphragm, causing death (Andral[4]). Or, again, it may be ejected through the lungs. Grisolle[5] gives a case where the pus of an encysted effusion was evacuated partly through the lungs and partly through the lumbar region, and which resulted in cure. De Mussy[6] also tells of two cases of cure after evacuation of the pus through a bronchus.

Prognosis.—Briefly, in primitive pleurisy, the tendency is toward cure. In secondary cases the prognosis is always grave, especially where it occurs in those of tubercular diathesis, and in cases of great delirium, obstinate hiccough, and of bilious vomiting; of excessive dyspnœa and of a purulent effusion. Double diaphragmatic pleurisy is not, as a rule, of grave import. Inflammation of the left side of the diaphragm is of more serious import, owing to the occasional involvement of the pericardium. Pleurisy occurring in the course of puerperal fever is extremely fatal.

It only remains for us to speak of the so-called benign form of diaphragmatic pleurisy to which attention was first called by Bucquoy,[7] and which would seem to be a distinct form of the disease. According to this writer, besides ordinary acute pleurisy, with more or less effusion, and that accompanying bronchitis or catarrhal pneumonia, with little or no effusion, and lasting a short time, there exists a separate and distinct form of acute benign diaphragmatic pleurisy, which always ends in cure. Hermil[8] agrees with Bucquoy in this opinion, and says that he has seen a number of such cases. I find also that the articles on inflammation of the diaphragm published since 1879 treat exclusively of this somewhat peculiar and interesting form of acute benign pleurisy. Bouchut[9] confirms Bucquoy's statements, and gives three cases of acute benign diaphragmatic pleurisy, all ending in cure. Monod[10] and Robert[11] each re-

1 Bull. de la Soc. Anat. de Paris, 1866, xli. p. 497.
2 Bull. d. l. Soc. Méd de Paris, 1874, p. 478.
3 Paris Thesis, 1876.
4 Loc. cit., vol. ii. p. 465.
5 Path. Interne, vol. i. p. 438.
6 Arch. de Méd., July, 1879.
7 Leçons Clinique, etc., Paris, 1873.
8 Loc. cit., p. 50.
9 Paris Méd., June 17, 1880.
10 Gaz. Heb. d Sc. Méd. de Bordeaux, 1880, i. p 751.
11 Revista de Cirucias Medicas, Barcelona, 1881, xii. p. 3.

port one case identical with the above; and Fiessinger[1] nine cases, all ending in rapid and complete recovery.

Acute benign diaphragmatic pleurisy begins, as does ordinary pleurisy, with chill, pain in the side, and fever. The painful points and radiating pains, the tender and retracted abdomen, etc., follow, and show conclusively that the inflammation is of the diaphragmatic pleura. Up to the third day the inflammation is limited to one side only, but from the third to the sixth day it extends, and we find the opposite side of the diaphragm involved. Its invasion of the other side is accompanied, however, by no great pain, and indeed all the symptoms are much less than those of the side first affected. There is some slight consolidation of the lung bases with enfeebled respiration; there is but slight effusion and little displacement of the liver and spleen. While all the symptoms are much less pronounced on the side last affected, the effusion on the side first involved rises to a much lower level than that of the opposite side. On the side first attacked we usually have a certain amount of retraction of the base of the lung from the presence of the fluid between it and the diaphragm. This fluid, however, does not always occupy this place, but by reason of the retractility of the lung, which draws the fluid upward with it, the liquid is spread out, as it were, between the lung and the thoracic wall, and so we may have the physical signs of a large effusion, though, in fact, the amount actually thrown out is quite small. As a rule, in benign pleurisy the bilateral effusion disappears without surgical intervention, and the dyspnœa, in spite of the double pleurisy, is but slight.

Another interesting feature of this benign form of diaphragmatic pleurisy is that the last pleurisy developed is the first to disappear. Pending its duration, however, there is little or no progress of the disease on the side first attacked. The development of the second pleurisy would seem to arrest the first, and the tendency is toward rapid cure. There is, in general, but little systemic disturbance, and the fever is moderate in this form of the malady. The extension of the inflammation from one side to the other seems to lessen all the bad symptoms. All such cases result in cure in from two to four weeks (Monod,[2] Hermil[3]).

[1] Rev. Méd. de l'est., Nancy, 1885, xvii. p. 332.
[2] Du Hermil, pages 73 to 77.
[3] Loc. cit., p. 66.

ATROPHY OF THE STOMACH, WITH THE CLINICAL FEATURES OF PROGRESSIVE PERNICIOUS ANÆMIA.

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Although for many years past the attempt has been made to associate certain cases of profound anæmia with wasting and degeneration of the gastric tubules, the occurrence of a primary atrophy of the mucous membrane of the stomach is still doubted, and probably the majority of pathologists agree with the statement of Welch, in his recent article on this subject in Pepper's *System of Medicine*, "that the existence of atrophy of the stomach as a primary and independent disease has not been established."

The following interesting case is offered as a contribution toward the solution of the question:

Samuel I., white, male, æt. forty-two, was admitted to the Episcopal Hospital on June 15, 1885. Seven weeks before this date he began to complain of weakness, loss of appetite, and perverted sense of taste—"everything tasted like pepper." Dyspnœa was also a prominent symptom. On slight exertion he would be seized with vertigo, and be compelled to sit down. There is no record of hemorrhage from any part of the body. There was, and still is (at date of admission), a tendency to constipation, the bowels being moved every other day. In the autumn of 1860 he had an attack of tertian intermittent. After treating himself with domestic remedies, among which vinegar and salt seem to have occupied a foremost rank, he was cured by Peruvian bark and port wine. Twenty-four years ago he had a venereal sore, followed by two suppurating buboes, but without other secondary symptoms.

He was on the police force from 1872 to 1880, during which period and subsequently, up to December, 1884, he was in the habit of drinking freely—"twenty to thirty drinks daily," many of them before breakfast—and eating at irregular hours. After leaving the police he drove an ice wagon, and was afterward a cab-driver. Eight years ago he had an attack of gonorrhœa. In 1876 he weighed 305 pounds, and was a prominent figure at a "fat-men's ball." His height is six feet two inches. In 1877 he began to grow thin, and continued to lose flesh at the rate of one, two, and three pounds daily. He was in the habit of weighing himself on the same scales in a shop in his district. He once during this period of rapid diminution of weight, lost seven pounds in twenty-four hours. This loss of flesh continued with intermissions for eight or nine months, until his weight was reduced to 147 pounds, when he began to regain, and in a year thereafter weighed 180 pounds. The patient's memory of the exact dates of these fluctuations in his bodily weight is not absolutely accurate, though sufficiently so for the purpose

of this clinical history. He attributed his loss of flesh to indigestion. At the period referred to, he was in the habit of vomiting almost invariably after taking food, and was frequently obliged to leave the table hastily on this account. His weight at time of admission was 139 pounds.

His skin possesses the peculiar yellowish pallor that is almost pathognomonic of pernicious anæmia, and the ocular conjunctiva is of the characteristic yellow hue, which differs, however, from the tint of icterus. The palpebral conjunctiva is milky-white, apparently bloodless. The skin of the abdomen is flaccid, and easily gathered in folds by a grasp of the hand, which fact is corroborative of the patient's statement regarding his former obesity. This statement, however, is proved by the best possible evidence, that of photographs in his possession. His girth was once fifty-two inches, and is now thirty-two. The patient dates his illness from a period about eight weeks prior to his admission to hospital. It began with dizziness, nausea, palpitation of the heart, and a sense of great weakness. These symptoms have continued up to date of admission.

The results of physical examination are, for the most part, negative. The heart sounds are very feeble and distant, and unaccompanied by murmur or *bruit*. The lungs are free from any sign of disease. There is neither tenderness nor increased area of dulness on percussion over liver or spleen. There is decided tenderness over middle of sternum, and a tender spot was also found on one of the lower ribs when making percussion in the splenic region. There is no enlargement of the lymphatic glands. The tongue is exceedingly pale in the centre, with pink edges and tip, but without fur. The urine contains a minute trace of albumin; its reaction is acid; its specific gravity 1.020; it is free from sugar and bile pigment. On June 16, 17, and 18, the temperature rose above normal: on the first of these dates to 101°, and on the two latter to 102°, in the evening. After the 18th the temperature was normal, while in hospital.

June 17. First examination of blood. Number of red globules per cubic millimetre, 790,000. Proportion of white to red, 1 to 158. The percentage of red globules, as compared with the normal number (5,000,000), that is to say, the "hæmic unit," is 15.8.

The majority of the globules are larger than normal and many of them are pear-shaped and oval. Microcytes present in considerable quantity. Schultze's granule masses scantily present. The color, as tested by Gowers's hæmoglobinometer, is 16 per cent.; therefore, the amount of hæmoglobin is relatively normal. This is a cardinal feature of pernicious anæmia. In all other forms of anæmia, the percentage of hæmoglobin is lower than that of the red globules. In pernicious anæmia, it generally equals, frequently exceeds, and has been observed by Laache to be double, that of the blood globules.

18th. An ophthalmoscopic examination was made by Dr. Albert G. Heyl, one of the ophthalmic surgeons to the hospital: "Both optic disks free from swelling, margins clear and distinct. In R. E. arteries of normal calibre, veins of increased calibre, at least double the size of arteries. A large hemorrhage, for the most part decolorized, was seen above the disk, and a more recent one upward and inward, in some places quite dark, in others of a raspberry-red. In L. E. the main upper vein was very full and inclined to be tortuous. The corresponding artery was abnor-

mally full. A hemorrhage was seen below the disk. The media were quite clear. The condition is that of engorgement of the retinal vessels, with hemorrhages such as occur in anæmia."

24th. Number of red globules per c. m., 1,195,000. Hæmic unit, 23.9. Color, 20 per cent. No white seen. The red globules vary greatly in size and shape, being oval, pear-shaped, and generally of irregular outline. Some of them are four times the normal size. There is a moderate number of microcytes.

The date on which the patient left the hospital is not preserved, but there are notes of a visit to him at his own home on June 26th, so that his stay in hospital did not exceed two weeks.

July 2. Came to have his blood examined, walking a distance of nearly two miles. Was not fatigued, but complained of a slight "numbness" in the legs. Number of red globules per c. m., 1,215,000. No white seen. Hæmic unit, 24. Color, 28. Globules abnormally large and irregular.

6th. Patient had an attack of diarrhœa, which began the day before (Sunday), although he had felt uneasiness in bowels since Friday, and had stopped his medicine in accordance with directions. He had been taking Fowler's solution, and had reached eight drops thrice a day, when diarrhœa set in.

7th. Sent for. He had five watery stools the day before, and one large, liquid, very offensive stool to-day. During the night, about 1.30, he had a decided chill. Pulse full and bounding, 112; skin hot and perspiring slightly; temperature 103.2°. Ordered 2½ grs. quiniæ sulph. every three hours, and suppository of half a grain extract. opii aq. every three hours until diarrhœa is checked.

8th. Has had thirteen stools since 12 M. the day before, but feels decidedly better, owing to subsidence of the fever. Pulse 80; temperature 99.8°. Wishes to get up.

10th (Friday). Sitting up and looking worse. Has had forty watery, offensive stools since Tuesday morning, five between 4 and 9 A. M. None since 9, when last suppository was used.

12th. Came to have his blood examined. Not so much fatigued as when he came on July 2d, which, considering the recent attack of diarrhœa, is remarkable. Number of red globules per c. m., 1,635,000. Globules, for the most part, much larger than normal, and of irregular shapes. No white in specimen. Hæmic unit, 32.5. Color, 40.

20th. Number of red globules per c. m., 1,605,000. Globules mostly very large, some of them three times the normal size, and very irregular in shape; a few microcytes. Hæmic unit, 32. Color, 30. The count is almost the same as the last, although the patient feels decidedly better, and walks considerable distances without fatigue, in spite of the intense heat now prevailing; the thermometer to-day reached 100° F., in the shade. His appetite is good, and the bowels are moved once daily. Ordered ferri pyrophosphat., gr. iiss *ter in die.*

Aug. 2 (Sunday). On Thursday patient came to have his blood examined, but it could not be done at that time. On his way home he drank a glass of buttermilk and soon after swallowed a plate of mock-turtle soup and a glass of lemonade. The consequence was an attack of cholera morbus the same evening. He treated himself with laudanum and blackberry brandy, and by next day the attack had ceased. On Friday he weighed 135 pounds. Number of red globules per c. m.,

1,640,000. Hæmic unit, 32.8. Color, 36. Average size of corpuscles still decidedly above normal. Very few microcytes. No granule masses. Shape of globules less irregular. No white cells seen.

10th. About the same. Blood not examined. Hydroleine prescribed.

15th. Feels much better. Weighs 140 pounds. Talks of getting to work—cab-driving. Has walked a distance of two miles without fatigue during the past week. Appetite good and bowels regular. Did not take hydroleine, but, by advice of an officious friend, took elix. ferri, quiniæ, et strychniæ phosphat., instead. Number of red globules per c. m., 1,805,000. Hæmic unit, 36. Color, 32. No white seen. Patient looks very pale and ghastly.

Sept. 2. Has been working as a street-car conductor for a week, getting up at 3.30 A. M., and working until late at night. Got along very well until two days ago, when an attack of diarrhœa compelled him to stop work.

12th. Working again as car conductor. Rises at 4 A. M. and does not get to bed until one o'clock next morning. He has, therefore, if his statement is correct, only three hours in bed. "Never felt better in his life," but looks exceedingly pale and thin. No. of red globules per c. m., 1,470,000. Hæmic unit, 29.4. Color, 35.

Oct. 21. No. of red globules per c. m., 1,255,000. Hæmic unit, 25. Color, 20. White corpuscles to red as 1 to 500. Globules large and irregular. Patient complains of great weakness in legs on walking short distances. Has been continuously at work as car conductor, though not on full time.

Nov. 19. Sent for, and found him lying down though dressed. Has not worked for a month and is exceedingly feeble. Has followed no regular treatment whatever, being incorrigible in this respect. Has taken lately some pills called "tree of life," which purged him freely and reduced his little remaining strength. He complained of difficulty in passing water, and stated that some years ago he had been treated for stricture by the late Dr. Maury. Passed a No. 15 (French) catheter and drew off a little limpid urine. No blood followed passage of instrument. (About ten days later No. 21 was passed without difficulty.) His quarters are very confined and dark, and exceedingly noisy from continual passage of Pennsylvania R. R. trains almost directly overhead.

Dec. 10. Sent for late at night on account of alarming dyspnœa. When visited he was relieved, the relief having succeeded the belching of large quantities of wind.

17th. About the same. He had apparently sent to inquire whether there was any prospect of his recovery. Ordered vin. ferri amar., ʒss, and liq. potass. arsenit., ♏iiss. *ter in die.*

21st. Worse. Diarrhœa began during the night and has weakened him considerably. This has been the invariable result of attempts to administer arsenic. The diarrhœa, which amounted to seven or eight watery stools, was checked by fifteen drops of laudanum. Ordered liquor ferri dialysat., gtt. v *ter in die*, to begin to-morrow, if diarrhœa does not return.

28th. Exceedingly pale and feeble. No conveniences at house for examination of blood. Taking ten drops of solution of dialyzed iron thrice daily.

On Jan. 5th, through the kindness of Dr. S. Weir Mitchell, he was admitted to the Summer St. Hospital. For several days before, he had

been exceedingly weak, unable to sit up, and complaining of a sense of utter prostration.

10th. He lay in a semi-comatose condition, from which he could be partially roused, but was unable to recognize any person. The pulse eighty, very small, soft, and compressible, and the respirations deep and sighing.

Number of red globules per c. m., 315,000. Owing to the extremely pale tint of the blood, the color test could not be employed. The count was made at three o'clock. At half-past four, Dr. T. G. Morton injected into the left internal saphenous vein, at about the junction of the middle and lower thirds of the leg, fifteen fluidounces of a solution of sodium chloride, 100 grains to the quart of distilled water. Present: Drs. Hunt, Cantrell, T. S. K. Morton, and Orville Horwitz. Toward the close of the operation, which, it is needless to say, was performed with the greatest skill, the patient became restless, and opened his eyes, but could not reply to questions. Pulse before and after transfusion unchanged in frequency (80), but somewhat fuller after the operation. 8.30 P. M., patient in condition of heavy stupor; pupils moderately dilated; pulse extremely weak, but still 80 per minute; respiration labored and sighing, but not stertorous. Died at 12.30, four hours later.

Autopsy, eleven hours after death. Rigor mortis present. Considerable emaciation. Cicatrices on glans penis. Panniculus not more than half an inch in thickness; fat of a deep yellow color. Great pallor of skin and all organs. *Muscles* of a light red tint. In *abdominal cavity*, peritoneum smooth; small amount of a dark yellow serum; the intestines distended with gas. In *right pleura* general adhesions. *Pericardium* covered with a moderate amount of mediastinal fat; slight excess of fluid in cavity. *Heart* large, right chambers full; walls flaccid; preliminary incisions show in right auricle much pale serum, with a large yellow clot; in right ventricle a colorless clot, infiltrated with serum, closely adherent to trabeculæ and chordæ; ten ounces of a watery blood were collected from these chambers. The left chambers were nearly empty; small thin clots blocked the mitral orifice. On further dissection of the heart, walls of normal thickness; muscle very anæmic, and evidently fatty; right chamber looks dilated; valves normal. *Aorta* not atheromatous; coronary arteries healthy. *Lungs* pale, crepitant throughout; the lower lobes very œdematous, and the infiltration extends to the adhesions which exist between the lobes; frothy mucus in bronchial tubes and trachea.

Spleen is slightly enlarged, moderately firm; pulp of a deep purple-red color; the Malpighian corpuscles not evident. *Kidneys* of normal size; capsules detach readily, surfaces a little rough; on section, cut with increased resistance; cortical portions pale; small arteries at bases of pyramids very prominent. The *suprarenal capsules* are of average size, firm; cortical portions of a deep yellow color. *Bladder* contains several ounces of clear urine.

Stomach looks natural, contains gas and about an ounce of dark fluid; pyloric orifice firmly contracted, and the ring seems thickened; cardiac orifice normal; length of organ eleven inches; breadth, when opened, eight inches. Walls not increased in thickness; at fundus two to three millimetres, at middle of anterior wall two and a half to three millimetres, and at pyloric zone, ten centimetres from the ring, eight to nine millimetres. General surface of mucosa pale; mucus covers the pyloric

region; there are a few dilated venules in several places. At the fundus the mucous membrane is very thin, smooth, grayish-white in color, tough, and tears with difficulty. No trace of superficial softening. In the middle zone it has the same pale gray aspect, is smooth, and there is an entire absence of the velvet-like appearance of the healthy mucosa. About the middle of the lesser curvature there is an old cicatrix, plainly shown by four or five radiating lines. In the pyloric zone, the mucosa is more vascular and decidedly thicker. Scattered over the surface of the membrane, particularly in the central zone, are numerous small, grayish-white elevations the size of a pin's head, most of them isolated, others in groups, and contiguous ones are joined by narrow lines of tissue projecting half a millimetre above the surrounding surface. Toward the pylorus there are larger, more flattened elevations, separated from each other by shallow areas of a pale gray aspect. With a low-power lens small orifices can be seen in these flattened elevations, and here and there in the smaller nodular projections little orifices and tiny cysts can also be seen. The general surface of the mucosa as examined with a hand lens, has a smooth cuticular appearance; the thin mucosa is readily movable on the muscularis; the submucosa does not appear thickened; and, with the exception of the pyloric region, there is no thickening of the muscular coat.

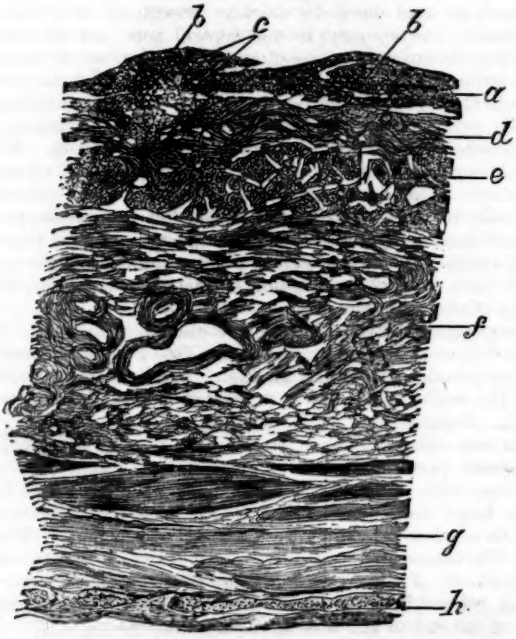
The œsophageal mucous glands are unusually distinct. *Duodenum* contains a bile-stained mucus. Bile flows freely from the orifice of the duct on compression of the gall-bladder. *Small intestines* contain a thin mucus. The walls of the jejunum look of average thickness; those of ileum thin. Peyer's gland, in the portions examined, normal. The large bowel was not opened. *Liver* looks large, is of a light yellow-brown color; capsule presents patches of thickening. Tissue cuts easily, and contains very little blood. Gall-bladder distended with pale bile. *Pancreas* very large, weighs more than 100 grammes; looks natural, lobules distinct; on section, presents a very normal appearance. *Thoracic duct* normal. The *thoracic* and *semilunar ganglia* have a natural appearance. No enlargement of the *bones*. *Marrow* of ribs and sternum of a deep purple-red color. That of lower portion of right tibia lymphoid, the cancellæ at the end of the bone contained fat.

Brain not examined.

Histological Examination.—*Stomach.* Portions were taken from four different parts and hardened in alcohol. (1) From fundus, where the mucosa looked thinnest and had a very smooth, cuticular appearance. Entire thickness of section about 3.5 millimetres, of which scarcely one-half is made up of the muscular coat. Neither glandular nor epithelial elements of the mucosa occur in the section, but immediately upon the muscularis mucosæ there is a narrow layer (Fig. 2, *a*) of flattened and small round cells, embedded in an indifferent matrix. In the stained preparation the nuclei of these cells are distinct, but the outlines are feebly marked. The muscularis mucosæ shows a remarkable alteration. There are two distinct layers, in the innermost of which the cells are cut longitudinally and form a prominent wavy band of fibres, which are marked even under low powers (Fig. 1, *d*, Fig. 2, *b*). From twelve to fifteen muscle cells can be counted in this band, which varies somewhat in thickness in different places. Below it, forming a much thicker and not so sharply defined layer, are the transverse fibres of the muscu-

laris mucosæ, seen in cross-section, arranged in bundles and groups, separated by more or less connective tissue (Fig. 1, *e*, Fig. 2, *c*). They extend for some distance into the submucosa, and in places there are alternate layers of transverse and longitudinal fibres below the distinct

FIG. 1.

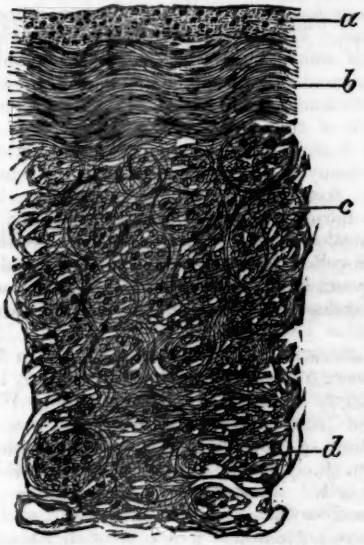


Section through mid-zone under low power, showing relations of the layers. *a*, mucous membrane with two of the nodular projections, *b*, *b*; *c*, remnants of tubules; *d*, muscularis mucosæ, fibres cut longitudinally; *e*, muscularis mucosæ, fibres cut transversely; *f*, submucosa; *g*, inner, *h*, outer layers of muscular coat. Low power. Ocular A. Obj. one and one-half inches.

band above mentioned. The submucosa (Fig. 1, *f*) presents coarse fibre cells and is loosely connected to the muscular coat. The bloodvessels are numerous and large and the walls of the arteries are much thickened. The muscular layers (Fig. 1, *g* and *h*) appear normal. The muscle cells do not look so large, nor are they as well stained or well defined as those in the muscularis mucosæ.

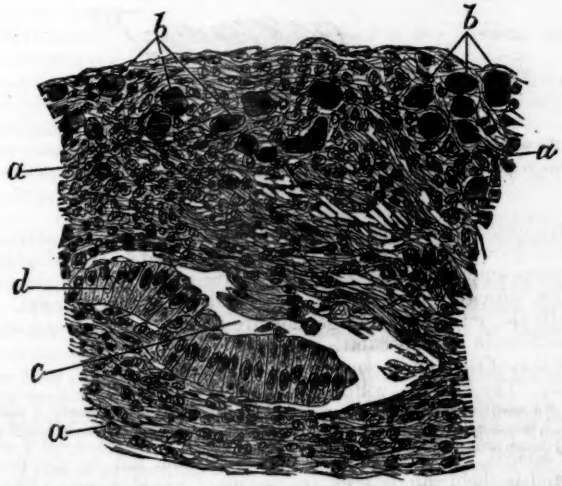
(2) Portion of the middle zone of the stomach in which are the nodular projections. The sections, which are from three to four millimetres in thickness, present essentially the same features as those from the fundus, but the small projections offer special features of interest. They are in reality remnants, or islets, of mucous membrane left in the general atrophy, and in them can be seen fragments of gland tissue. Even on inspection of the fresh organ with a low-power lens this seemed apparent,

FIG. 2.



Section of mucosa of fundus *a*, remnants of glandular layer; *b*, inner band of muscularis mucosæ, fibres cut longitudinally; *c*, outer layer of muscularis mucosæ, fibres cut transversely and arranged in bundles; *d*, beginning of submucosa Ocular A Obj. one-fifth inch.

FIG. 3.

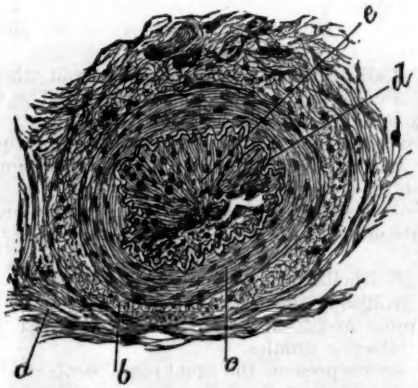


Portion of one of the nodular projections of mucosa, under high power. Ocular A. Obj No. 8. *a*, the small-celled infiltration; *b*, large spheroidal cells with eccentric nuclei, the remnants of the peptic cells; *c*, portion of a tubule with cylindrical epithelium; at *d*, the cells were displaced.

for in these portions and nowhere else could the orifices of tubules be seen. These portions are flattened, mushroom or pear-shaped, pyramidal or even pedunculated. Three tissue elements can be seen in them: (1) a basis or matrix of small round cells (Fig. 3, *a*) which stain deeply and give a very pronounced color to these parts; (2) large rounded epithelioid cells with eccentric nuclei, resembling, though somewhat larger than the normal gland cells of the peptic tubules (Fig. 3, *b*, *b*); (3) remnants of the tubules (Fig. 3, *d*), chiefly of the uppermost portions, with columnar epithelium. In many sections these tubules are represented as empty spaces (Fig. 1, *c*) from which the cells have fallen, in others they are still present. A normal-looking tubule was not seen, only portions; in places cystic dilatation seems to have occurred. At the base of the projections the small-celled infiltration is very dense and abuts directly in the longitudinally cut band of fibres of the muscularis mucosæ. Between two of these nodules, the mucosa has the appearance described in section 1.

(3) Flattened elevations in the pyloric region 5 or 6 centimetres from the ring, which were 5 or 6 millimetres in diameter, and stood out distinctly surrounded by areas of pale gray mucosa. With the low-power lens the orifices of peptic tubules can be plainly seen. On section, the columnar epithelium of the surface is seen in a few places. The tubules are distinct, particularly in the central portion of the patches, but the amount of small-celled intertubular growth is very great, and toward the margins it becomes the preponderating tissue, and a peptic tubule is only here and there noticeable. The cells of the tubules look normal in the central portion of these elevations, but toward the periphery they can be seen in all stages of atrophic degeneration.

FIG. 4.



Section of a small artery in submucosa. *a*, stroma; *b*, adventitia; *c*, muscularis; *d*, elastic lamina of intima; *e*, proliferation of subendothelial connective tissue, resulting in almost complete obliteration of the lumen of the vessel.

(4) Portion from the neighborhood of the pylorus. Thickness of section nearly six millimetres. Epithelium not apparent on the surfaces.

The tubules are numerous and large, with normal-looking epithelium. There are groups of closely set glands, but in most places the tubules are separated by the small-cell infiltration, which in certain regions, corresponding doubtless to the interspaces between the mammillations, occupies the entire thickness. Small cysts also occur in this region. The muscularis mucosa is thicker here than in the sections described under (3).

The arteries in the submucosa presented thickened walls, particularly the muscular coat, and in almost every section vessels could be seen in process of obliteration by subintimal proliferation, as represented in Fig. 4.

Bits of the fresh mucosa from various parts were teased carefully in salt solution. Except in the pyloric zone, no tubules or cylindrical epithelium were found. In some of the nodular projections remnants of gland tissue and a few columnar cells were seen. Gentle scrapings of the surface and the teased bits show a large number of flattened cells, unlike anything met with in the normal mucosa. They are irregular in shape, longer than broad, with granular protoplasm and central nuclei. The average measurements of a number gave $\frac{1}{1280}$ to $\frac{1}{853}$ of an inch in length, and $\frac{1}{2560}$ to $\frac{1}{1280}$ of an inch in breadth. Some of these are remarkably long; measurements of four gave $\frac{1}{213}$, $\frac{1}{320}$, $\frac{1}{284}$, and $\frac{1}{256}$ of an inch, and from $\frac{1}{800}$ to $\frac{1}{1000}$ of an inch in breadth. Many of the cells, particularly in the pyloric region, look like swollen glandular epithelium of the peptic follicles. Flat ribbon-like muscle cells are numerous in all the portions examined, and there is a distinct fibrous stroma thickly beset with cells. Throughout this there are in places groups of rounded, translucent bodies, resembling the amyloid corpuscles met with in degenerating tissues.

Sections of the *duodenum* show many normal-looking tubules, but here, too, the amount of intertubular tissue seems excessive. Brunner's glands look healthy.

Unfortunately, by an oversight, portions of the jejunum and ileum were not reserved for examination.

Pancreas. Cells of the acini very granular, but otherwise normal; in places there are dark brown pigment grains. The interacinous connective tissue is slightly increased.

Heart muscle very fatty, but the degeneration is unequally distributed, as is evident, indeed, macroscopically. The brown pigment granules are very abundant in many fibres.

Liver. Cells distinct, moderately fatty. Small brown-red pigment grains very abundant both in the gland cells and in the connective tissue elements.

Kidneys. Epithelium of cortical portions swollen, and in places very fatty. The reddish pigment granules are very numerous, both in the convoluted tubes and in the epithelium of the loops of Henle, and in some of the collecting tubules.

The *bone marrow* presents the usual constituents of this tissue. There is very little fat; the marrow cells of various sizes make up the chief part, but the ordinary red corpuscles are abundant, and many of them are very large (megalocytes) Nucleated red corpuscles occur in numbers. There is no essential difference between the marrow of rib, sternum, and tibia, except that in the last-named bone the cancellæ at the end contained fat.

Sections of the *semilunar ganglia* show deeply pigmented nerve cells and an excess of connective tissue.

SUMMARY.—*Clinical.* History of drinking habits for many years. Ten years ago severe gastric symptoms with great loss of flesh. For more than nine months severe symptoms of anæmia, with nausea, occasional diarrhœa, and irregular fever. Corpuscles greatly reduced, sinking to 315,000 per cubic millimetre. Transfusion; death.

Anatomical. Extreme anæmia, with the usual fatty changes in the organs and hyperplasia of the marrow of long bones. Atrophy of mucous membrane of the stomach, with complete destruction of the secretory tubules in the larger part of the organ. Hypertrophy of the muscularis mucosæ.

REMARKS.—The patient with the foregoing clinical history presented a vivid picture of progressive pernicious anæmia. Every symptom was present in bold relief: the excessive pallor and prostration, the anæmic fever, the retinal hemorrhages, and, above all, the extreme reduction in the number of the red globules, with, at the same time, a normal *proportion* of hæmoglobin, the alterations in the size and shape of the globules (poikilocytosis), and the presence of microcytes in abnormal amount. The most prominent symptoms were those of profound gastric disturbance, due to the prolonged abuse of alcohol, and the rapid diminution of weight. In less than one year the patient lost more than one hundred and fifty pounds. This is by no means the first case of pernicious anæmia to which gastric disorder stands in causative relation. Similar cases have been reported by Fenwick,[1] Quincke,[2] and Nothnagel,[3] through which a bright light has been thrown upon the pathology of this hitherto obscure disease, and it is for this reason that exception is now taken to the indiscriminate application of the term "idiopathic" to cases of progressive pernicious anæmia. The rapid loss of flesh may be regarded from another point of view than that of symptomatology. It is a well-attested fact that fevers, inflammatory and essential, are of more serious import in fleshy, so-called plethoric individuals, than in those of sparer habit, and, in explanation, von Recklinghausen[4] suggests that the rapid absorption of fat and the products of fatty metamorphosis may give rise to a qualitative change in the composition of the blood.

The conservation of the muscular strength is also worthy of notice in this and other cases. On August 15 the patient walked two miles without fatigue, when there were less than 2,000,000 red globules per cubic millimetre. A patient of Laache, of Christiania, walked three kilometres (more than two miles), the entire distance being *up hill*, when his blood contained less than 1,000,000 globules per cubic millimetre.[5]

[1] Atrophy of the Stomach, 1881.
[2] Volkmann's Sammlung Klin. Vorträge.
[3] Deutsches Archiv für klin. Med., Bd. xxiv.
[4] Deutsche Chirurgie, 1883, Bd. i. p. 180.
[5] Die Anämie, S. Laache, Christiania, 1883, p. 147.

Such facts acquire additional significance when taken in connection with the deep red color of the muscles in these cases. It would appear that the muscles in pernicious anæmia are nourished at the expense of the other tissues.

All attempts at treatment in this case were rendered nugatory by the irritable state of the intestinal tract and by the patient's wilfulness and perversity in regard to matters of diet. Leaving out the blood examinations, in which he always took a keen interest, it was impossible to secure his coöperation in any diagnostic or therapeutic procedure. Although repeatedly requested to save the urine secreted during the whole twenty-four hours, in order that its percentage of urea might be estimated, he only managed to do so once. On this occasion (June 26) the amount was 45 oz.; sp. gr., 1.012; percentage of urea, 2.05 (normal). There was no albumen.

The only special lesion in the case was the atrophy of the mucous membrane of the stomach. This was evident to the naked eye in the thin, cuticular appearance, and was abundantly confirmed by the microscopical examination, which showed that the peptic glands had been destroyed over the greater portion of the organ. The numerous small elevations which existed in the middle zone, represented areas of the mucosa less advanced in degeneration, and are comparable to the nodules of relatively normal tissue which beset the surface of a cirrhotic liver. Toward the pylorus, where the atrophy was less advanced, the various stages of the process could be traced, consisting essentially in a small-celled infiltration between the tubules, such as occurs in all forms of slow interstitial inflammation; and we may reasonably conclude that this process, extending over many years, ultimately led to the condition here described. The only other alternative is the supposition that a creeping ulceration had at one time involved the greater part of the mucosa, with the exception of the little islets of tissue already mentioned, and in healing had left the membrane in this state. The radiating cicatrix at the lesser curvature no doubt indicates that the patient had had, at one time, probably in 1877, when the gastric symptoms were so marked, an ulcer in this region, but the uniform, smooth appearance of the membrane, the absence of puckering, and the condition of the muscularis mucosæ, are not consistent with the view that there had been extensive ulcerative destruction, such as in rare cases does involve the stomach. In these instances, the process is not confined solely to the layer of tubules, but involves the muscularis mucosæ, which is infiltrated with round cells, and in healing the mucosa and submucosa are closely united to each other. Except at the site of the cicatrix, the mucous membrane was in this case freely movable on the muscular coat. The remarkable hypertrophy of the muscularis mucosæ is an associated condition not easy of explanation, but we call to mind in this connection the increase

in the unstriped muscle elements in other conditions associated with irritation or degeneration, as notably in the lung of the cat affected with the nematoid parasite Ollulanus; and in the bronchial tubes of man in some cases of chronic bronchitis.

The recorded cases of atrophy of the stomach with clinical features of pernicious anæmia are not very numerous. Fenwick[1] describes four cases, Quincke[2] one, Nolen[3] two, and Brabazon[4] one; and in all of these the mucous membrane was affected without special alteration in the thickness of the walls of the stomach, or any diminution in its capacity. Nothnagel's case was one of cirrhotic contraction of the stomach and atrophy of the peptic glands, with the clinical features of pernicious anæmia. In some of these cases the histological examination was very defective, and the exact condition remains doubtful. In Fenwick's cases the interstitial connective tissue was greatly increased, and the gland tubules atrophic, but there was not the extensive destruction of the glandular layer which was so marked a feature in our case. The histological account in Nothnagel's case, by W. Müller, makes it clear that there was complete atrophy of the tubules in the entire organ, with the exception of the pyloric region. There was great thickening also of the muscularis mucosæ.

It seems natural to conclude that in the case we have described, the abuse of alcohol, extending over many years, played a part in the causation of the atrophy. Certainly he had chronic dyspepsia, and had suffered from a gastric ulcer; but while these not uncommon conditions may lead to moderate wasting of the mucous membrane, such extensive destruction of tubules is rarely seen. In the cases narrated by Fenwick there was no history of alcoholism. In connection with the extensive endarteritis of the smaller gastric vessels, and the existence of scars on the glans penis and in the groins, the possibility of a syphilitic process may be considered, but we know as yet very little of the influence of syphilis on the stomach, and the recent attempt of Gaillard[5] to connect certain forms of gastritis with this disease cannot he regarded as in any way successful. It is quite possible, however, that the state of the small arteries may have had something to do with the production of the atrophy. We have learned of late years to connect indurative processes in other organs with arterio-sclerosis and the endarteritis of the nutritive vessels of the mucosa may really have played an important part in inducing the wasting. In a recent review of this subject, Martin[6] suggests that certain lesions of the mucosa may be due to these end-arterial changes, but acknowledges that, with regard to the stomach, the facts are as yet too few to warrant any conclusions.

[1] Loc. cit. [2] Loc. cit. [3] Centralblatt f. d. med. Wissenschaften, Bd. xx.
[4] Brit. Med. Journal, 1878, ii. [5] Archives Générales, January, 1886.
[6] Revue de Médecine, January, 1886.

To the other anatomical features of the case we do not propose to refer. The reader will doubtless have noted the identity of the conditions with those in pernicious anæmia, even to the hyperplasia of the bone marrow and the pigmentation of the cells in the organs. One point, however, is worthy of note, viz., the large size and healthy appearance of the pancreas. This organ varies greatly in size, but we regard it as certainly hypertrophied in this case, and we may see here possibly a compensatory effort to supply the defects in gastric digestion.

A careful study of this case justifies, we believe, the conclusion that a primary atrophy of the mucous membrane of the stomach does occur; and it further bears out the original suggestion of Flint, confirmed by Fenwick, Nothnagel, and others, that certain of the cases of progressive pernicious anæmia depend upon profound alterations in the gastric tubules.

For the sections and drawings we are indebted to the skill of Dr. J. P. Crozier Griffith.

REPORT OF A CASE OF MULTIPLE MYOMATA OF THE SKIN,

ACCOMPANIED BY SEVERE PAIN; WITH REMARKS.[1]

By W. A. Hardaway, M.D.,

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The following case, of which I shall present brief notes, together with a plaster cast showing the size and general arrangement of the growths, is, I think, worthy of record as a contribution to the study of painful tumors of the skin:

J. B., German, aged thirty-six years; he is married and has two healthy children; his wife is also healthy. His family history is good, and he does not recall that either of his parents ever suffered from any cutaneous disease. He has never had syphilis.

So far as his knowledge goes, his present trouble began about one year ago. He observed that when the weather changed—that is, became either hot or cold—he experienced a drawing pain, lasting about five minutes, in the place where the lesions are now situated. When the pain subsided he was unaware of anything abnormal in this situation. These pains were absent sometimes for two or three weeks, sometimes a day, sometimes three or four days. To relieve these paroxysms he would make firm pressure over the affected region. At this time, however, he does not remember that, between the paroxysms, any pain was evoked by either accidental or intentional pressure. Later on, but he cannot say when, he was aware of the presence of a few lesions, and from time to

[1] Read before the American Dermatological Association, August 27, 1885.

time thereafter he was conscious that others became developed. He is quite positive that for the last six months the patch has existed pretty much in its present shape, and has not further progressed.

Of course, all of these statements must be taken with due allowance, and we can only be tolerably certain as to the length of time during which the subjective symptoms have been present; the tumors themselves may have been established long before his attention was attracted to them, especially as they are situated on the back, out of the field of vision.

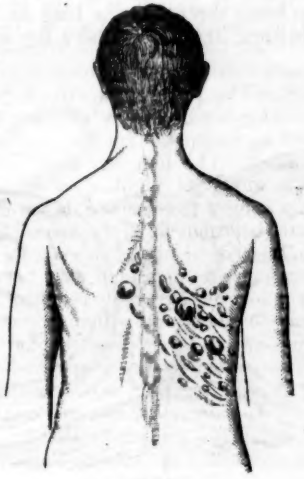
PRESENT CONDITION.—The patient is a strong, hearty man, five feet ten inches in height, and, according to his own account, has never been sick. He is a peddler by occupation, and is constantly exposed to all the vicissitudes of weather. The neuralgic pains referred to above still persist. They come on mostly at night, when in bed. The intervals between the attacks are subject to considerable variations. At one time he will suffer nocturnal visitations for six or more nights together; then he will escape for two successive nights, or even for a week altogether. Of late, they have been more frequent and more severe. He is inclined to regard changes in the weather as largely responsible for his sufferings. The paroxysms appear suddenly and without premonition of any sort. Each attack lasts from two to three minutes, but is not repeated the same night. When a paroxysm occurs, the patient says that he feels as though he were being crushed together, and he rolls and tosses about in his bed in great agony. To gain relief, he turns on the affected side and instinctively makes deep, strong pressure with his hands. So far as he can judge, the pain is absolutely confined to the region of the growths, and does not radiate.

Examination made in the intervals of the attack shows that the parts are not at all hyperæsthetic, superficial touch with the fingers producing no symptoms of any kind; but moderately deep direct pressure with the tip of the index finger will cause him to drop to the floor, moaning with agony. In this case the pain appears to be but momentary, and is entirely different in character from the vice-like pressure of the spontaneous attacks. While pressure made almost anywhere over the affected region will cause the patient to wince, the acute pain follows only upon pressure over the larger tubercles. I do not now recall that there was any change in the color of the region involved during a paroxysm, or that there was any difference in the temperature or the occurrence of quiverings or contractions in the parts; but I must confess that, as my attention was not particularly called to these points at the time, they may have been overlooked.

DESCRIPTION OF THE LESIONS.—The infiltrated patch or plaque is situated on the right side of the back, in the mid-dorsal region, Fig. 1. It commences at the spinal column and takes an oblique downward course. It is four and a half inches long by two and a half inches wide. It passes over to the left side of the spine by two small tubercles. The great bulk is to the right of the column. The patch is made up of an aggregation of variously sized growths and infiltrations. Some of them are round and decidedly elevated above the level of the skin, at least three being as large as hazelnuts; others are elevated a few lines only and spindle shaped, or else dispersed in lines and streaks. The growth seems to involve the substance of the skin only, and is not bound down to the subcutaneous structures. The overlying epidermis is not scaly, or

otherwise appreciably abnormal. The patch is of a reddish color, and the large tumors do not look unlike flesh moles. None of the growths are pedunculated.

FIG. 1.



Infiltrated patch.

Some time after he first came under observation, I passed a weak galvanic current through the tuberculated region, and whether as a result of the treatment, or from a mere coincidence, the patient thought that the intervals between the paroxysms had been extended. However, he appeared to suffer as much as ever when firm pressure was made over the larger tubercles.

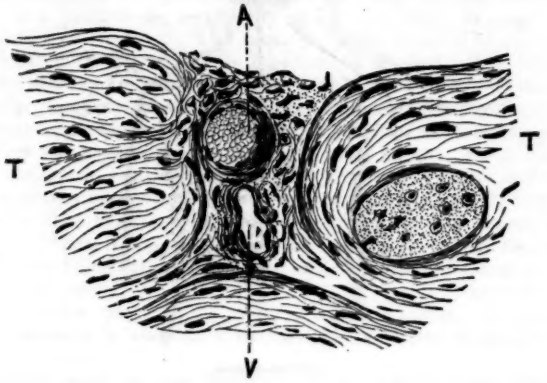
At my request, his physician, Dr. H. Tuholshe, cut out one of the large growths for microscopical examination. The tumor seemed to be encapsulated in the skin. Dr. L. Bremer, of St. Louis, to whom the specimen was submitted, made the following report of his microscopical investigations: "The tumor is about the size and shape of a large split pea; it is hardened in alcohol. Vertical sections, unstained, show moderately hypertrophied papillæ in some places, a comparatively thin layer of derma, and beneath this an apparently smooth mass when examined with a low power. Sections treated with picrocarmine show the usual reactions of the epidermis, an intensely red color of the derma, and a straw-colored mass beneath it. Prolongations from the derma, all characterized by their red color, traverse the former as narrow bands in all directions. The straw-color of picrocarmine staining indicates that the tissue lying beneath the red mass is composed of smooth muscle fibre. I had no saffronine at my disposal to verify and corroborate the result obtained by the picrocarmine test.

"With a view of establishing the presumed presence of nerve fibres in the new growth, osmic acid and chloride of gold were used; both these reagents yielded negative results. Neither myelinic nor amyelinic nerve

fibres could be demonstrated. No new formation of nerves could be ascertained.

"On staining the sections with hæmatoxylon, rod-shaped nuclei appeared in great numbers, coming in different directions, showing the characteristics of the nuclei of smooth muscle fibres. They varied in length, some of them being three times as long as an ordinary nucleus of the smooth muscle fibre; there were also a few spindle-shaped nuclei.

FIG. 2.



Proliferation of the muscular elements of an artery (A) and a vein (V). TT, tumor. Hæmatoxylon and eosine. Hartnack, 3, vii.

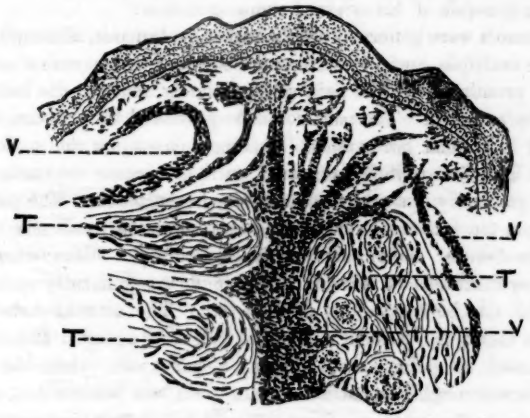
In the course of the septa furnished by the bands emanating from the derma, arteries and veins could be seen in a state of proliferation of their muscular elements. The same could be observed to a still greater extent in the derma. No normal artery or vein was to be seen in the latter. There was not, however, any appreciable round-cell infiltration around the vessels, such as is seen in inflammatory processes. It is probable that some of these strings of nuclei represented cutaneous nerves. No normal cutaneous nerve could be made out.

"The tumor, in my opinion, is a conglomerate of interlacing bundles of smooth muscular fibres. These bundles are formed by the proliferation of the muscular elements of the arteries and veins of the original derma, Fig. 2. There seems to be a limit of this process at the point where the veins and arteries lose their muscular layer and pass into capillaries. This would account for the stationary, non-progressive character of the tumor, as demonstrated by the clinical history of the case.

"In the fully developed tissue of the growth, I never observed the process of division in the rod-shaped nuclei, whereas I could see it in the immediate neighborhood of the proliferating vessels. The gradual transition from the muscular elements of the vessels into tissue tumor could be seen in a satisfactory manner in a number of specimens stained with hæmatoxylon and eosine, Fig. 3.

"I do not claim this report to be exhaustive, on account of the small amount of material obtainable: only one tumor was examined."

FIG. 3.



Proliferating bloodvessels and their relation to the tumor and the derma. V V V, vessels in a state of proliferation. T T T, lobes of the tumor. Hæmatoxylon and eosine. Hartnack, 3, iv.

REMARKS.—Looked at from a purely clinical standpoint, it will be seen that the case just reported bears a strikingly close resemblance to the cases recorded by Duhring[1] and Kosinski,[2] which were looked upon by the authors mentioned as instances of pure neuroma of the skin. In all three cases we find certain characteristic features that they have in common, viz., the presence of numerous tubercles more or less embedded in the skin itself, and giving rise to unusually severe pains as a result of pressure or else of a spontaneous character. While in Duhring's case they occupied no nerve tract, in Kosinski's patient and my own this connection seems obvious. Whether the tumors in my case bore some relation to the cutaneous distribution of the dorsal nerves, I cannot say; at any rate, the presence of nerve tissue in the tumor examined was not demonstrated.

Looking further in this direction, we discover that in the muscle tumors of the skin reported by Besnier[3] and Solles,[4] the growths were painful in the first observer's patient as the result of pressure only, but in the patient of the latter the tumors were the seat of pain, both spontaneous and when provoked by traumatism of various kinds, and which,

[1] AMERICAN JOURNAL OF THE MEDICAL SCIENCES, Oct. 1873, and Oct. 1881.
[2] Centralblatt f. Chirurgie, No. 16, 1874.
[3] Annales de Derm. et de Syph., 2me Sér. t. i. No. 1, 1880.
[4] Ibid., 2me Sér., t ii. No. 1, p. 60.

at first confined to the part irritated, afterward radiated in all directions. Wood's cases of subcutaneous painful tubercle, which were probably examples of fibromata and fibro-neuromata, also presented symptoms which differed little from those just described, as will be seen from the following synopsis of his original communication:[1]

The tumors were generally single and subcutaneous, although in some instances multiple, and in one instance so superficially seated as to form a visible prominence. The pain was extremely acute in the lesion itself, but it also radiated. The pain could be provoked by pressure, and also occurred in violent paroxysms. During a paroxysm the suffering was slight at first, but rapidly increased until it became excruciating. It went off gradually, leaving the parts sore to the touch. The paroxysms lasted from ten minutes to two hours, and increased in severity with the age of the disease. Some had ease for days, or even weeks; others would have several attacks in one day. The pain was generally spontaneous, but could also be aroused by friction, etc. The attacks usually came on in the night, the patient waking in frightful agony. Handling the parts caused no pain, except during a paroxysm, when the affected region became acutely sensitive. Acute pain was produced at all times by changes in the weather. Some patients stated that they were sensible of an increase in size in the tumor and a change in color during an attack.

Most of his patients were females. Wood credited Cheselden with having first called attention to these painful tubercles. It is a significant fact, that in all of these cases, whether classed as fibromata, neuromata, or myomata, the subjective symptoms are nearly identical.

I shall leave entirely to the consideration of pathologists the various interesting histological questions that arise in this connection; as, for example, whether there exist true neuromata in the sense of tumors composed of newly formed nerve fibres; the connection between fibroma and neuroma; what causal relation, if any, exists between these variously constituted growths and the nervous system, etc.; but, as a clinician, I believe that the following conclusions, arising from a consideration of the points mentioned above, are to a degree justified:

That certain new growths in the skin and subcutaneous tissues, accompanied by severe pain, both of a spontaneous character, and as produced by direct irritation, may be of widely different histological structure; and that, therefore, from a clinical standpoint, we are not justified in assuming that a painful tumor or tubercle is a neuroma (fibro-neuroma) from the subjective symptoms that it presents, or from the macroscopic character of the lesions.

[1] Edin. Med. and Surg. Journ., July, 1812.

PARTIAL, AND SOMETIMES GENERAL, CHOREA MINOR FROM NASOPHARYNGEAL REFLEX.

By A. Jacobi, M.D.,
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The boundary lines between the normal and abnormal functions of the peripheral nerves are frequently but indistinct; thus it is that now and then morbid conditions are overlooked or underestimated. Changes of that kind are often tolerated with the expectation that the trouble will pass by, that the patient will outgrow it; and the period of the second dentition, or of menstruation, is held out as the future anchor ground for restored health. Many of these deviations are reputed to be but bad habits, for which admonition, punishment, and patience are put into requisition. But bad habits are just as well the results of physical changes in the structure of the nerve centres or their outlying provinces, as morbid changes in the functions of the coarser viscera spring from their anatomical alterations.

For many years my attention has been drawn to some of these apparent habits which I soon recognized as actual diseases. The cases were so numerous after they had become familiar to me, that they soon lost the mark of novelty, and after I had once failed to speak of them except in clinical lectures, I looked upon them, because of their frequency, as daily occurrences and likely to be familiar objects in the practice of every physician. Thus I have never mentioned the subject in any assembly of my colleagues until recently, and was surprised to find that what I considered trite, was still worth mentioning before a learned public.

I allude to a number of convulsive muscular movements of the face and the upper portions of the trunk. Children of three years and upward, up to the ages of puberty and even adult life, are given to blepharospastic winking with the eyelids, in rare cases with but one of them; momentary and frequent frowning, both horizontal and vertical; twitching of one or both angles of the mouth, and of one or both halves of the face; drawing up and wrinkling of the muscles of the nose; shrugging of a shoulder or both, now and then complicated with a violent, semi-convulsive twitching and tossing of an arm. These anomalous muscular actions persist for years, indefinitely; mild cases, however, I have often seen improve spontaneously during the summer months, and get worse during winter.

These abnormal actions are but rarely confined to a single muscle, even in mild cases two or more of the contractions I have mentioned are found together. In adults only, I have met with a few cases of

partial twitching confined to a single cheek, exactly like the genuine *tic convulsif.* Now and then this clonic local spasm belongs to the same category, and is attributable to the same cause which is the subject of these remarks. Occasionally the local clonic contractions will lead to more severe complications. The muscular irregularities extend to the diaphragm, and over the whole body, and a genuine chorea minor is the result. This generalized chorea, when originating in this manner, is very much more liable to persist than the, perhaps, more severe cases we are familiar with as the results of articular or cardiac rheumatism, of spinal anæmia, or even of cerebral embolism. Unless their cause be recognized, I have seen them lasting through quarters and halves of, or even whole years, getting somewhat better occasionally, particularly in the warm season and good weather, but liable to return any moment. The large majority of patients of this class are children.

Beside the muscular anomalies mentioned, there are some others which draw our attention to the primary cause of the disorder. There is frequent snuffing up, snuffing out, a hawking, a short hacking cough which often is recognized as the result of a voluntary effort. The examination of the fauces reveals congestion of the whole surface, swelled muciparous glands, large tonsils with or without the results of previous inflammations or suppurations. They need not always be congested; such as have suffered most are even apt to be unusually *pale from the presence of compressing cicatricial tissue.* The pharyngeal congestion is observed to ascend in the direction of the posterior nares. The inspection of the nose reveals a congested and swelled mucous membrane, and the thickening and hyperæmia of the cavernous tissue particularly of the lower concha, which is justly claimed as the principal lesion occasioning many instances of spasmodic asthma or neuralgic affections of the trifacial nerve. The nostrils, or one of them, are always rather narrow, the septum frequently deviated, slight admixture of blood with the nasal mucus is sometimes noticed; now and then the cheeks and upper lip are puffed with chronic œdema, the so-called scrofulous face, and not infrequently the lymphatic glands of the neck, near and in front of the angle of the lower jaw, are swelled. Nasal catarrh is reported as frequent; many of the patients have been life-long snorers. Otherwise nothing appears to be abnormal, with the exception of those cases in which the persistent hyperæmic swelling and nutritive disorder had given rise to hyperplastic thickening. In many of these cases part of the surface is anæmic, dry, and rather hard. Nervous disorders of any kind but those described have not been observed; in fact, most of the children seen by me did not exhibit any universal neurotic expression or tendency.

Thus there is not necessarily a direct connection between these irregular choreic symptoms of local origin and general neurosis, at least the

former do not depend upon the latter. If general nervosism were the cause, its effects would be apt to be general. For the local effect there is a local cause; even in the usual form of generalized chorea the involuntary spasmodic reflex movements are occasioned by local irritation. Thus it is that the quietude of sleep does away with choreic movements, but again semi-voluntary movements during a dream are liable to produce choreic irregularities even during sleep. The local cause of the local or partial chorea I have described, is found in the abnormal condition of the nasal and pharyngeal mucous membrane with its influence on the terminal sensitive ends of the trifacial nerve. It is to be assumed that the motor branches and terminal ends of the same nerve are first affected, and before any other nerves participate in the reflex symptoms.

These motor branches of the trifacial supply the masticatory muscles, the temporal, masseter, and pterygoid, the tensor of the velum palatinum, the mylohyoid, and the anterior belly of the digastric muscle (also the tensor tympani). It is these muscles which are brought into abnormal play in the symptoms described before. After some time only, the trapezius, the muscles of the upper extremities, and finally the rest of the body, participate in the display of irregular movements.

The sensitive and vasomotor reflex symptoms, mainly hemicrania and asthma, subsequent to the subacute and chronic swelling of the nasopharyngeal cavity, and particularly the loose cavernous cellular tissue of the inferior concha, are well known by this time to everybody. The results of the studies and therapeutic measures of Voltolini, Haenisch, Sommerbrodt, and particularly Hack, whose last lucid and modest *exposé* in the proceedings of the German Congress of Internal Medicine is but nine months old, have added greatly to our knowledge, and the relief of the suffering. It is, however, not my object to repeat what most of us have read and practised by this time. Why I allude to their labors, has, however, its good reasons. Their observations are supplemented by mine. Theirs belong to the sensitive and vasomotor nerves, mine to the motor. Their observations have, moreover, the priority of publication. Mine date, in their large majority, from a period antedating by many years their published records. I make this statement in order to impress it upon the minds of my readers that I do not rely upon a few cases, but that in the course of many years I have seen so large a number that I feel confident there will be no lack of similar cases in practice, as soon as the attention of practitioners has once been drawn to their existence.

There is another reason why I allude to Hack's last exposition. As a reaction from his former enthusiasm over exaggerated results, he appears now to be a little doubtful about the importance of some local changes in regard to producing reflex symptoms. Hyperplasia and polypi are, according to him, no longer causes of reflex symptoms. On the contrary,

according to him, they are liable to impede reflex, and when the latter does exist it is asserted to be present in spite, not in consequence, of hyperplasia and polypi. This I believe to be a mistake. I have no doubt, whatsoever, that many of my cases of muscular reflex were the result of irritation of nerve filaments embedded in hyperplastic and cicatricial tissue. The irritation of peripheral nerves in neuromata, and in cutaneous cicatrices, are the very best proofs of what a pinched nerve branch can get up in the way of suffering.

Nor has it appeared to me as if our knowledge of these matters, both as to cause and effect, was nearly complete. It is true, the description of the nose and pharynx as given by these authors, and that of the neuralgic and spasmodic reflex symptoms related by them, is both accurate and conclusive. But in both their symptomatological and anatomical teaching, something appears to be wanting. This want is perhaps the cause of the fact, that the therapeutical results leave much to be desired, as Hack is very anxious to state. In addition to that, insufficiency of the anatomical descriptions is particularly evident, when we take into account the more modern researches of G. L. Tornwaldt ("On the bursa pharyngea in its relation to the diagnosis and treatment of certain diseases of the nasopharyngeal space," 1885), and of F. Trautmann ("Anatomical, pathological, and clinical studies on hyperplasia of the pharyngeal tonsil," 1886). I speak of both because of the relative novelty of the subject of nasopharyngeal reflexes, and of the difficulty of the anatomy of those parts which, though the rhinologists and rhinoscopists assure us that the diagnosis of these affections is rendered play-work with the aid of their modern instruments, mirrors, hooks and lights, exist nevertheless.

Tornwaldt says that the entrance of the bursa pharyngea can be seen with the aid of hook and rhinoscope almost in every person. It is a groove, or an aperture—funnel-shaped, spherical, or oval—in the median line of the roof of the fauces, in about the centre of the distance between the upper margin of the posterior nares and the protuberance of the atlas. The bursa itself has more frequently the shape of a sac or a blind canal than of a groove; as its aperture is mostly narrow, the bursa is a frequent starting-point of nasopharyngeal diseases. The affections of the bursa proper are of two kinds, first, hypersecretion in consequence of a catarrh spreading from the neighborhood, which is very apt to prove permanent though the original neighboring catarrh may have disappeared; and, second, cystic degeneration by obstruction of its outlet.

In persistent catarrh of the bursa the flow of liquid mucus, or the deposit of viscid mucus can be recognized in the midst of, or below a relatively healthy mucous membrane. The cyst is a tumor of a transparent yellow color. In some cases, however, it can be diagnosticated only by the

absence of the aperture, the presence of cicatricial marks, and the absence of secretion in the midst of a congested and secreting neighborhood. An incision gives vent to the discharge of the liquid or pultaceous contents. The symptoms of both hypersecretion and cystic degeneration of the bursa are rather identical with those of nasopharyngeal catarrh. Of accompanying symptoms belonging to other organs the author mentions hyperæmia, hyperplasia, perhaps also polypi of the nasal mucous membrane, diseases of the ear, pharyngitis granulosa, chronic laryngeal catarrh mainly of the intra-arytenoid portion, bronchial and chronic gastric catarrh, cough resulting from the direct irritation by the descending secretion, and reflex cough not attended with perceptible laryngeal or pulmonary disease, bronchial asthma, and pain about the manubrium sterni, occiput, neck, or forehead. The duration of the diseases of the bursa is rather indefinite; they persist unless the bursa is restored or destroyed.

The pharyngeal tonsil which forms the subject of Trautmann's large monograph, is known to surgeons as one of the causes of retropharyngeal abscess. He, however, studies its pathology principally in its relation to the diseases of the surrounding territory, and to the reflex symptoms produced by it. Amongst these he refers particularly to cephalalgia of the temporal and frontal regions. He found it eighty-seven times in one hundred and fifty cases, and explains it by venous obstruction. It disappeared with the removal of the hyperplasia in every case except two. In one of these *vomiting* and *fainting* were observed once; there was a nasal polypus. *Tetany* twice in one hundred and fifty cases. Its explanation is as above, in the opinion of the author.

Venous obstruction in the nasal conchæ is absent in but a few cases. It is mostly developed in the lower concha, and mainly in its posterior part. The second concha is not swollen to the same degree. The color is grayish-red, or bluish-red. When the disease is of old standing, there is hyperplasia of the subepithelial connective tissue, and the surface of the concha is no longer smooth. It becomes granular, and redder than before. After the hyperplastic pharyngeal tonsil has been removed, venous congestion of the concha will disappear. But the hypertrophy of the subepithelial connective tissue requires surgical treatment. The sense of smell was never abolished, and in all cases in which it occurred (eighteen times in one hundred and fifty cases), epistaxis ceased after the operation.

Thus it follows that the examination in cases of both sensitive and vasomotor reflexes on one hand, and the muscular reflex symptoms referred to by me, is not so easy as it appeared to be. I think there is reason to believe that the majority of cases of hemicrania and asthma which were not relieved by Hack, and others, by the galvano-cauterization of the hyperæmic and swollen tissue of the inferior concha, were not

such as were caused by that affection, and that locality. The improved knowledge of the anatomy of the nasopharyngeal cavity will probably clear up the etiology of many a case which was not diagnosticated correctly, and both pharyngeal bursa and tonsil will come up for their share in both etiology and treatment.

There is another mistake which is very apt to lead to serious results. Nasopharyngeal catarrh is not a well-defined nosological entity. It is quite true that catarrh of the nose and pharynx, and also of the conjunctiva, are found together. This, however, every unprejudiced practitioner has found to be a fact, that one cannot be cured without the other, and that when one remains the others will relapse. Still another fact must not be overlooked. There is many a case of nasal catarrh with all its consequences, both local and reflex, which is but the continuation and result of a pharyngeal catarrh. It will get well only when the latter has been removed. Thus many a rhinitis has to be treated in the pharynx, and many a pharyngitis in the nose; and both may never get well unless the enlarged or abnormal tonsils have been removed, or resected. This is not only true of the large tonsillar masses closing in with each other, but also of those tonsils which, having been the seats of repeated inflammations and suppurations, have nothing left but cicatricial tissue, broken-down follicles, and ducts of one-quarter to one-half inch in length leading in every direction, with abnormal secretions undergoing decomposition and giving rise to constant local irritation.

REVIEWS.

A System of Obstetric Medicine and Surgery, Theoretical and Clinical. For the Student and Practitioner. By Robert Barnes, M.D., Obstetric Physician to St. George's Hospital, etc., and Fancourt Barnes, M.D., Physician to the Royal Maternity Charity, etc. Illustrated with two hundred and thirty-one woodcuts. 8vo. pp. 884. London: Smith, Elder & Co. Philadelphia: Lea Brothers & Co., 1885.

The stream of obstetrical literature continues in steady flow. The ambition of teachers, the enterprise of publishers, the desire for novelty, all concur in impelling the current, and volume succeeds volume with increasing rapidity. The one which we have now to submit to that criticism which, in the preface, seems to be challenged, bears a name which needs no introduction anywhere in the world. There is no more active worker in the profession than the elder Barnes. The excellence of his treatise upon *Diseases of Women* is everywhere acknowledged. Moreover, his work upon *Obstetrical Operations*, now before the profession since 1870, entered a new field in the teaching of this branch in our language. Going more fully into the application of mechanical principles to artificial delivery, copiously illustrated, the book was warmly welcomed by every student of the subject. Further, the author, in that work, showed himself capable of rising above insular prejudices, and improved the obstetric science of his country. By his adoption of the long forceps, and his energetic advocacy of their superiority, his teachings had a powerful influence in extending their use, and, in corresponding degree, in lessening that frequency of resort to the perforator, which will always remain a blot upon the history of British midwifery.

There are many influences, then, tending to insure a friendly reception to anything upon obstetrics from the pen of Robert Barnes. It would be very agreeable if we could say the same of the son. Unfortunately, there is a little matter relating to the publication by Fancourt Barnes of a German medical dictionary, which does not dispose the profession of this country kindly toward him. That this little volume, published as his, was boldly copied from one the production of an American physician,[1] is only too evident from the fact that the very errors of the one duly appear in the other; mistakes of orthography and of punctuation are so faithfully reproduced as to render a defence of the charge of plagiarism impossible. We think Fancourt Barnes's share in the production of this work very small indeed. In the preface it is stated that the portion on antiseptic midwifery and "the description of the operations" is his work. Some even of the former very brief por-

[1] Dictionary of German Terms used in Medicine. By George R. Cutler, M.D. New York: G. P. Putnam's Sons.

tion bears unmistakable marks of Robert Barnes's pen, while as to the operations, if the new ones are alluded to, it will soon be seen how singularly deficient the work is in regard to them. Fancourt Barnes owes, without doubt, the appearance of his name in the title-page rather to the partiality of the parent than to the amount of work performed by him.

However well disposed may be the feeling toward a favorable acceptance of any work bearing the name of the senior author, this book should still be critically examined in the interests of the science of which it treats. It enters the world of letters, and it should be judged by its merits. It is needless to say that the character of other books by the same pen presents no guarantee as to this one. Especially should the work be judged by the aim and objects of the author in its production. Dr. Barnes set out to present a "fairly complete treatise" on which the work treats, to produce "a hand-book of obstetric medicine and surgery for the use of the student and the practitioner," that is, a work which may serve as a manual for the one and a reference-book for the other. A careful examination of the volume in this light compels the record of a very great disappointment. It would not be possible for Dr. Barnes to give us less than a complete treatise, or one without evidence of marked ability. So this book is complete in the sense of containing something on all the subjects pertaining to obstetrics. In many respects it is able; we could point to some chapters of great excellence, and some portions which leave nothing to be desired. The volume might be truthfully dismissed with the stereotype phrase, that "it deserves a place in every library." Yet a critical examination reveals so many faults, so many points in which it is behind the times, so much of importance lacking, and so many doctrines to which we cannot assent, that a feeling stronger than surprise is experienced, and duty impels us to an examination of some of the more practical portions of the work, and to such a presentation of its leading characteristics as will suffice for the formation of a judgment by our readers.

That portion of the work relating to obstetrical operations needs but little attention, as it has been long before the profession as an independent volume. Meantime, however, there have been some notable additions to our instruments, and some very important modifications of operative procedures, and the author's judgment in regard to these will be looked for with as much interest as anything else in the book. First among instruments stands, of course, Tarnier's axis-traction forceps. The description of this instrument here given is extremely meagre, and unworthy so important an addition to our armamentarium. No one could get a good idea of Tarnier's forceps from the mere statement that "the perineal curve is provided with special traction-bars attached to the lower ends of the fenestræ." Nor do the illustrations make the matter clear. There are but two; in one the instrument is shown as applied, and thus partly within the pelvis; the other is a diagram of the direction of the force, as applied with this and with the ordinary instrument. The fact is, that Tarnier's instrument is not adopted or recommended, but Aveling's is preferred by the author. This instrument was presented to the Obstetrical Society of Great Britain in 1868, and is claimed to be the type of the modern axis-traction forceps. The handles are carried backward in a pronounced curve behind the perineum, so that the whole has a sigmoid shape. Traction at the end of these handles, it is claimed, is true axis-traction, and fulfils all the aims and intentions of Tarnier's

instrument. We fail to see it, and this mental blindness seems also to have affected the obstetrical world. Thousands will read of Aveling's forceps for the first time here, while Tarnier's is known everywhere. We fail to see how the traction force is applied by Aveling's instrument "as nearly as possible to the centre of the child's head;" and think that the index-needle principle of the handle of the Tarnier forceps deserves more attention than the curt dismissal given it by Dr. Barnes. "Upon the whole, we think the index-needle principle may be dispensed with."

But there is another point in regard to this forceps. It is claimed that "the great share in the invention of the modern type of axis-traction forceps must be awarded to Aveling." Now Dr. Barnes quotes frequently from the encyclopædic work of Charpentier,[1] and must, therefore, know of the forceps of Hubert, of Louvain, which were brought out in 1860, eight years before Aveling presented his. In this instrument the handles are bent backward at a right angle to admit of the same application of force as in Aveling's. It would be a mere quibble to claim that there is a material difference, because by Aveling the modification is a "sigmoid curve," and by Hubert it is an angle. The principle and the intended effect are identical, as plainly appears from the description and comments in Charpentier. Dr. Barnes, therefore, has gone out of his way to make a claim for his countryman which is not justified by the facts and which cannot be sustained.

We have no fault to find with the author for preferring the forceps of Aveling, but he should be just. Also, a recent work on obstetrics should contain a fuller and a clearer description of so important an addition to our resources as Tarnier's forceps. His opinion as to the influence of the instrument upon practice is important, and must be given. It bears upon the great question, turning *versus* forceps, and is favorable to the latter as against the former.

"We have arrived at the conclusion that generally the forceps is to be preferred; and that in those cases in which the feet have come first, either spontaneously, or after turning, still delivery of the after-coming head by the forceps is preferable to dragging the head through by the hands. The forceps should be tried first; and it is all-important to use the traction forceps. Having brought forth living children by this instrument from women who had lost children by turning or with ordinary forceps, we cannot doubt its superiority. The axis-traction forceps, thus extending the domain of the forceps, *pari passu* lessens the domain of turning. This is a crucial test of the value of the axis-traction forceps."

Two other instruments, more or less novel, also deserve more attention and better description than they receive in this section. They are the cranioclast and Braun's decapitating hook. To the former efficient and useful instrument no description at all is accorded, while two cuts are given to Tarnier's complicated and expensive basiotribe. For all that the student could gather here, the cranioclast and the cephalotribe are the same instrument, and although the former is illustrated, as applied, by two cuts, he would be further confused by reading of crushing the head by the screw working at the ends of the handles, when neither cut shows any screw. In regard to Braun's decapitator, there is not a word to indicate that it is an instrument differing from all others devised for effecting the same purpose. Indeed, the text is misleading, for with-

[1] Traité Pratique des Accouchements; two volumes, Paris, 1883.

out any distinction being made, it is treated in the same paragraph with Ramsbotham's decapitating hook, an instrument provided with an edge, which Braun's hook has not. Nor is the matter helped by the illustration; Braun's hook appears in the drawing exactly as if it were a cutting instrument. Neither as to construction nor mode of action, then, is this instrument fairly presented. The student is presumed to know all about instruments, to have had them shown for inspection during his course of instruction. This is an assumption more complimentary than satisfactory; it is a fault often committed by Dr. Barnes, and not unfrequently by writers who teach in large hospitals where demonstration accompanies every step. It is a fault of which an author should not be guilty who writes upon a subject so cosmopolitan as obstetrics; it is the provincialism of a metropolis.

We regret to be compelled to say that the amount of attention bestowed in this section upon the new operations is singularly unsatisfactory. To obviate some of the dangers, and lessen the risk of Cæsarean section, several modifications have been lately not only proposed, but executed, and a certain amount of experience with them has been gained, while neither of them has, as yet, conquered a position of acknowledged superiority. In this country we have had the revival of laparo-elytrotomy, and in Germany and Italy the Müller and Porro operations are being executed. It may be safely said that no subjects connected with operative obstetrics are to-day invested with such an interest as these operations, the best manner of performing them, and the relative results thus far attained. Whoever looks in this book to find either will be sadly disappointed. Laparo-elytrotomy is disposed of in less than half a page, Porro's operation in a little more space, while Müller's is dismissed with just *three lines!* As to the technique of the different operations, the barest statement of the different steps is made as to Porro's, while in laparo-elytrotomy it is stated that the vagina is to be incised, and not a word is said of the necessity of tearing it in order to avoid hemorrhage. Again, these operations are before the profession, awaiting the verdict of further experience. Surely, to look for some expression of opinion, from an author so well acquainted with the practical side of obstetrical art, as to what that verdict will be, is not expecting too much. It is not here; neither are there comparative statistics. The new operations are to be judged by a comparison of results obtained with those of the simple Cæsarean section. No data are given. It would be deemed scarcely possible that a work should be published claiming to be "up to the times," and yet present no results of this latter operation more recent than the general statement of Pajot, in 1875, and the summing up of Schröder, of 1874. It pleases Dr. Barnes in this work to deprecate the value of statistics in obstetrics, he does it repeatedly; yet we think that just here some statistics later than those of a decade ago would be of value, that even those of this country, of an entire continent, collected with such indefatigable industry by Dr. Robert P. Harris, were deserving of reference mention, if not of reproduction, since they have a bearing of great practical value upon these operations.

No subject connected with obstetrics has made greater progress within about twenty years past than extrauterine gestation. With the plea for laparotomy after bursting of the cyst by Stephen Rogers, of New York,[1] it

[1] Transactions of American Medical Association, 1867.

entered upon a new era, while the treatise of the lamented Parry[1] added much to our knowledge and stimulated study of the subject. In diagnosis we have left far behind the dictum of Depaul as to its impossibility, while as to treatment substantial advances have been made of the most gratifying character. It is with regret that we do not find the chapter upon this subject by Dr. Barnes abreast of the times in any of these particulars, nor is the general treatment of the subject satisfactory. First, it is marred by too many subdivisions, with a series of symptoms for each. Thus, we have tubal, abdominal, and tubo-uterine varieties, and besides these the "retro-uterine" dependent merely upon the accident of location. This cannot but confuse both student and practitioner. Even to the latter it is difficult enough to establish the fact of an extrauterine pregnancy without attempting to distinguish the particular variety. To assist in establishing the fact itself the symptoms should be clearly presented and strongly emphasized, and although the diagnosis of this condition will frequently prove one of the most difficult of problems for solution, there are a few strongly marked symptoms almost always present, which, if heeded, will at least put the practitioner upon his guard and excite the closest investigation. Gestation in the tube is given by Dr. Barnes as the type, and we read:

"A tubal gestation may be predicted from the presence of the usual subjective signs of pregnancy, added to which is pain—this, says Goupel, is constant; and the local objective signs."

Now if there be one marked characteristic of the pain of extrauterine gestation it is its recurrence in attacks of the severest kind; it is agonizing in degree, but intermittent in character.

The next most prominent symptom of extrauterine pregnancy is hemorrhage—gushes of blood occurring at irregular intervals. This symptom is not only unemphasized, it is not mentioned in this connection. On a preceding page it is said that "hemorrhage commonly precedes bursting of the sac," and this is all. Some hundreds of pages further on, in the chapter on placenta prævia (p. 574), we read the following:

"Robert Barnes drew attention to a fact, now generally recognized, that, before the rupture of the Fallopian sac in tubal gestation, discharges of blood by vagina often take place."

Does Dr. Barnes intend to convey the impression that he *first* drew attention to this fact? It appears so, because he gives a foot-note to his work on *Diseases of Women* as if to clinch the statement. The symptom was not only mentioned by Rogers in his essay, but its importance impressed, the doctrine urged that when a patient presented this symptom, together with attacks of severe pelvic pain, there need scarcely be further doubt as to the existence of extrauterine pregnancy.

There is one other symptom of this important abnormal condition not always present, but when it occurs is held to be pathognomonic. We allude to the expulsion of the decidual lining of the uterus. Again we have to note total omission. This leading symptom is not mentioned at all by the author. That the decidua is formed is stated, and a figure of a specimen given, but there is not a word as to the diagnostic import of its extrusion! The account of the "local objective signs" is also far

[1] On Extrauterine Pregnancies, Philadelphia, 1876.

from satisfactory. It is doubtful whether a tumor can be at once "fluctuating" and "tense," and we find no allusion to the marked vascular action in the tumor usually to be observed by the touch, nor is there any allusion to its rapidity of growth which can be observed certainly from week to week, a point insisted upon by Thomas.

When we come to the treatment of this condition, we find matters still worse. Under the light of recent experience all remedies and all measures must yield precedence to one, electricity. None are worthy of any thought or consideration until this has been tried. Let us see what Dr. Barnes say of it:

"Bachetti proposed to kill the embryo by passing an electric shock through the cyst. Duchenne suggested the shock of a Leyden jar." P. 246.

"During the first stage the embryo or fœtus may be killed by Duchenne's plan of shock by a Leyden jar." P. 248.

This is all! It "has been proposed" to kill the fœtus by electricity! Now, how stand the facts? Professor Allen's two successful cases with faradization have been before the profession since 1872. If there had been but one, it would be the duty of every teacher to urge a trial of the remedy for a condition so perilous as extrauterine pregnancy, as a means of escape from a calamity so overwhelming as rupture of the sac. But there have been nearly a dozen successful cases. There is a mass of testimony in favor of this remedy which is simply overwhelming. It is to be found, too, in the transactions of a society of which Dr. Barnes is an honorary member.[1] And yet, with the responsibility of a teacher upon him, he still recommends puncture of the sac, the fatality of which is notorious, or thinks that, in the abdominal variety, "upon the whole, expectancy is perhaps the wisest course!"

The author's name is closely associated with the subject of placenta prævia, and every one into whose hands this volume comes will turn with interest to see what modifications, if any, his doctrines have undergone, or what support increased experience has given to them. The more closely the name of a teacher is connected with any particular doctrine in medicine, the more carefully should his writings be scrutinized, especially as to accuracy and impartiality. At the outset one cannot avoid expressing the wish that something more of simplicity had been attained in the treatment of this theory-ridden subject. What possible good, for instance, can arise from debating whether the hemorrhage is caused by the ovum growing away from the uterus, or the uterus growing faster than the ovum? The point cannot be settled, and if settled would be of no practical value. The real cause we have seen given in clearer language than that of Dr. Barnes:

"An efficient cause of hemorrhage, interstitial and continuous, we believe to be irregular, spasmodic uterine contractions. The presence of the placenta over the os uteri is a cause of reflex irritation [?]; and irritation, once begun, is almost certain to go on, and this in an irregular, metastatic [?] manner. There is perverted polarity."

We wish, also, that there was something less in this connection of "Barnes's discovery"—of "Robert Barnes's discovery of the distinction

[1] Transactions of American Gynecological Society, vol. vii.; Electricity in Extrauterine Pregnancy, by Henry J. Garrigues; History of Twenty-one Cases of Extrauterine Pregnancy coming under Personal Observation, by T. Gaillard Thomas, vol. ix. A further report upon extrauterine pregnancy, six additional cases, by the same author.

between the upper part and the lower third of the uterus." If the author has made any discovery of value in regard to placenta prævia, it is in regard to treatment. There is surely no "discovery" in pointing out the portion of the uterus, in proportion to the occupation of which by the placenta, is the danger. This is a fact recognized by all since this vicious implantation of the placenta has been understood, although the author's division of the uterus into "zones" of safety and of danger makes an admirable and impressive student's demonstration. In regard to this point, Dr. Barnes prides himself much upon "Bandl's ring" as confirmatory of his discovery. Since the existence of this ring has been called in question, we must await further anatomical research.[1] Neither can the cessation of bleeding upon dilatation of the cervix sufficient for the head to pass be considered a "discovery" until it shall be shown to be a universal, and not an exceptional, occurrence.

The statement that "the greater hydrostatic pressure in the vessels, when the placenta is prævious, than is the case when it grows to the fundus," has a strong influence in promoting the hemorrhage, is pure hypothesis.

In the treatment of placenta prævia by Dr. Barnes, some points deserve consideration. Recognizing the importance of efficient uterine contraction, the existence or the absence of which gives such a different aspect to a case, he directs, first, puncture of the membranes, supplemented by a firm abdominal binder. The next step, the os remaining undilated, is the tampon, and this is far from receiving the estimate it deserves. A proper application of the measure does not consist in "ramming soft substances into the vagina," as Dr. Barnes speaks of it. Nor does he give here any directions for properly applying it, and says nothing of the importance of using a speculum for the purpose, without which it cannot be made efficient. There need be little wonder, then, that he has scant confidence in a tampon; but, when we read that it is "to be removed in an hour at the furthest," we wonder more what it was ever applied for. In this low estimate of the value of the vaginal tampon, in certain conditions a most valuable resource, the author stands alone among authorities.

The special point in the treatment of placenta prævia which Dr. Barnes warmly advocates is, as is well known, separation of it from the uterine walls by sweeping the finger around the cervix as high up as it will reach. This, he claims, is a measure original with him, one of great value, and one which yields decidedly more favorable results than any other plan of treatment. It is open at once to the objection which Robert Lee made to Simpson's plan of entire detachment and removal of the placenta, and which is quoted here: "How is it, then, that furious flooding takes place when the placenta is in the pot under the bed?" He has had but a meagre experience with placenta prævia who has not learned that the patient is not safe from flooding, even after the third stage of labor is completed. This partial separation having been effected, "*often the hemorrhage ceases.*" As much can be said of Simpson's method, and the same result sometimes follows when nothing has been done. But it is not necessary to enter into a debate as to the value of Dr. Barnes's measure; that remains to be determined by further clinical experience. There is something to be said, however, of the manner in

[1] A Note on Bandl's Ring. By Wm. T. Lusk. Trans. Amer. Gyn. Society, vol. ix.

which he presents and would sustain it. We regret to see that he is in several particulars decidedly unfair, to use the mildest expression, toward other systems of treatment, and the facts supporting them, and that he shows the characteristics of the advocate, rather than the man of science. Thus we read:

"Before the views of Robert Barnes prevailed, the practice was to deliver at once; and this was often done without much regard to the fitness of the parts to undergo this severe proceeding."

Again: "The unavoidable hemorrhage theory, simple and absolute, dictated, as we have seen, immediate delivery, the *accouchement forcé*. . . . What does the *accouchement forcé* mean? Literally and practically, it means violent delivery at all risks. The hand was *forced* through the cervix, dilated or not dilated. . . . This forcible entry accomplished, the child was then seized, turned, and extracted as promptly as possible."

We regret to be compelled to state that this is simply not a true statement of the treatment of placenta prævia "before the views of Robert Barnes prevailed." Ramsbotham and Churchill, Meigs and Hodge, were immediate predecessors of Dr. Barnes, and they all teach that the hand is only to be introduced when it can be done "without incurring the risk of injury," and they recognize such delivery as here described as entirely exceptional, only now and then a deplorable necessity, a last resort to save a perishing patient.

Further, Dr. Barnes keeps in the background the fact that the flooding of placenta prævia generally induces a relaxed and dilatable condition of the cervix. Not only does he fail to hold this fact out to the practitioner as a foundation for some hope when worst comes to worst, but he speaks of it as "the arbitrary hypothesis which assumes that, in these cases of flooding, the os uteri is, by the flooding, *always* made easily dilatable." Dr. Barnes owes it to himself to support the italicized word by references. We were under the impression that the doctrine is, that the os is thus *generally* affected. Either we are wrong, or the author has misrepresented obstetric authorities. However, in denying this usual effect of hemorrhage, Charpentier says that Dr. Barnes is in opposition to the generally accepted views of the profession.

The practical results of treatment are, of course, the crucial test. Dr. Barnes gives "his experience of the terminations in 69 cases; the deaths 6—*i. e.*, 0.9 nearly." Of course, this is a typographical error; it should be "9 per cent. nearly." This is not later than 1864! All results given since then are five cases in 1884, all the mothers and four children recovered. This mortality of about 9 per cent. is exceedingly satisfactory, yet it is greater than that given by Spiegelberg as resulting from the earliest possible delivery, which was, under Hoffman, 6 per cent.; Hecker, 7.5 per cent.; and by himself, 5.4 per cent.; this, however, independent of the loss from puerperal diseases following.

The many questions yet unsettled in regard to puerperal fever, and the great interest attaching to the subject, render it imperative that the views of one occupying so high a position as Dr. Barnes, both as a teacher and writer, should be presented to our readers. It is an exceedingly difficult task to perform. The author is not methodical in his divisions and subdivisions, not always clear in statement, and often confusing. We will try to present briefly, but fairly, and as clearly as possible, his teachings upon this disease, in which, it is well said, "we find the reflection of every doctrine prevailing in medicine from the

days of Hippocrates." The chapter is headed "The Puerperal Fevers." It includes the various local affections known as pelvic cellulitis and peritonitis, as well as phlegmasia dolens, under the name of "thrombotic puerperal fever." These diseases are "puerperal" certainly; they are accompanied by "fever," also; yet it is evident that the student's interests would have been better consulted, by placing these affections, in all of which the local are more prominent than the general symptoms, each in a chapter by itself. But the plural term is distinctly used for the general disease, and the doctrine emphasized that there are puerperal fevers. We are surprised, however, to see this author refer to Meigs as one who "wrote of childbed fevers." There is not in obstetric literature a more fervid apostle of the doctrines that puerperal fever is always the same, that it is an inflammation, and only and always an inflammation, than Meigs. "The disease is *one*," he says, "the writers and talkers are legion."[1]

As varieties of the disease cannot be made upon a basis of pathological anatomy, Dr. Barnes recognizes first a "simple excretory fever," arising from failure of excretion from the blood of, *a*, lactic acid, the result of the violent muscular action of labor; *b*, the waste of uterine and other tissues of gestation. These two poisonings are forms of endosepsis. Then comes a form arising from poisoning by absorption of foul stuff from the genital canal. So far, the fever is an autosepsis, and so far the disease is autogenetic. Then comes the form dependent upon infection or inoculation of some foreign poison; this is exosepsis. Next we have the zymotics, depending upon scarlatina, diphtheria, and erysipelas, and these, with the preceding, are the heterogenetic forms. "Thus we may understand that there may be a *simple* endosepsis, that autosepsis is grafted upon endosepsis, and exosepsis is a compound of all three."

Two questions relating to puerperal fever, or the febrile affections of childbed, if the term be preferred, are of passing interest at the present time. These are, the relation of these affections, in origin and nature, to septicæmia, and their dependence or non-dependence upon micro-organisms.

The theory of the septicæmic nature of puerperal fever, now most widely accepted, is closely connected with the traumatic origin of the disease, and both are considered together by Dr. Barnes. The origin of "traumatism" is attributed to German lying-in hospitals. We had always thought this doctrine began with Cruveilhier's likeness of the uterus to the stump of an amputated limb, and that Simpson was one of the main supporters of it. The doctrine is but very briefly considered here, and curtly and dogmatically dismissed. "The wounds in the puerpera are physiological," but why this makes them any less possible entrances of poison we are not told. "The wounds are inevitable, and if kept clean, and the subject is healthy, are harmless." "Traumatism alone cannot induce puerperal fever. Traumatism is universal, and fever is exceptional." "Appeal to the hypothesis of traumatic fever is vain." The objection is made to the septicæmic theory that septicæmia is a compound term, there are varieties of it, as there are varieties of puerperal fever. But we find here not the slightest attempt to harmonize doctrines, by pointing out the possible modifications of the morbid process caused by the altered state of the blood of the pregnant and puerperal woman, so

[1] Treatise on Obstetrics, Philadelphia, 1852.

justly estimated by Dr. Barnes in other parts of the work; all effort is directed to show that the diseases cannot be identical, none to show the similarity existing between them. The strongest arguments against the septicæmic theory, fully accepted by its adherents may be given in two lines: "It does not account for cases before there is a wound, nor for the propagation to non-puerperal women." But the strong argument against the septicæmic theory to be drawn from the undue proportion of unmarried puerpera who suffer from puerperal fever he does not use at all. Altogether, the subject is not nearly so well treated here in what is intended to be a standard treatise, as in an essay the author published in the *American Journal of Obstetrics*.[1]

To the great question of the dependence of puerperal fever upon microörganisms Dr. Barnes devotes just two pages, and what he gives is not only limited, but partial. Nearly one page is quoted from Charpentier, and gives Raymond's representation of Pasteur's views. It is very singular to find, upon turning to Charpentier, that six pages of that work, devoted to the views of Doleris, whose treatise, Charpentier says, is no more than a faithful translation of Pasteur, are passed over unnoticed to reach Raymond's views, which are quoted. Is it because the objections to the doctrine follow immediately upon this quotation, and are copied, without credit? The whole paragraph, on page 679, of Dr. Barnes's work, beginning, "And how, it has been pertinently asked," is translated, word for word, from Charpentier, without quotation marks or reference. Is it because that quotation ends with the following remark?

"When we consider the variety of forms presented by puerperal fever, it is difficult to admit that it is caused by an infecting agent, one microscopic organism."

This sentence, standing alone, seems to throw doubt on the matter, but it does not touch the main question at all. If it was worth while to present Pasteur's views, Dr. Barnes could have found, within six pages of the above quotation, the following decided language:

"One undoubted fact results from all observations and all experiments—*the presence and the action of inferior organisms.* In accord upon this point with all investigators who have preceded me, I can affirm *that the morbid germ of the disease, always present in the sick woman, is always absent in the healthy one,* that this germ is a living organism, susceptible of reproduction under the unequivocal conditions of rigorous experiments, and capable of reproducing nearly constantly the lesions connected with the phenomena observed in patients harboring them; that the morbid germ differs in a certain measure according to different forms of the disease, and, I will add, according to the lesions, which appears to me more exact."[2]

Is all reference to Doleris omitted because he is said to have proved the pathogenetic character of bacteria by cultivating them, and by injecting them into animals reproduced the pathological lesions of puerperal fever? It would seem that a treatise upon a subject of so great importance as this of Doleris,[3] one so recent and so revolutionary, should have received some notice, and its doctrines some statement in a work which aims at presenting all subjects pertaining to obstetrics in their latest aspects.

[1] On Septicæmia in Midwifery and Antiseptic Midwifery, January, 1882.
[2] Charpentier, t. ii. p. 885.
[3] La Fievre Puerperale et les Organismes Inferieurs, 1880.

Dr. Barnes closes this section of the subject with three short paragraphs:

"When, in any case of puerperal fever, the presence of these micrococci has been detected in the exudation, they have also been found in the deeper organs.

"Other microörganisms may be present, but their presence in the dead body does not always prove that they existed in the living body; they are often the result of post-mortem decomposition.

"It is as yet impossible to classify puerperal fever as regards course and prognosis according to the varieties of the microörganisms found (Doléris), or according to their mode of invasion (Fraenkel)."

This is all. Not one of them bears upon the main question at issue: "Does puerperal fever depend upon the presence of organized beings?" nor is there even an approach to an expression of opinion upon this point. But, again, these three paragraphs are taken, word for word, from Somer's admirable paper,[1] without credit and without quotation marks.

On another page Dr. Barnes quotes Somer, and gives in a foot-note the title of his paper. He knows the paper, therefore. Then why did he not quote such sentences as these, which may be found in it?

"The chain-like micrococci have frequently been found both in the exudations and in the organs of patients having died of puerperal fever.

"It seems as though all who sought for them have been able to find them in every case.

. . . "Not only can these germs be found in such patients, but that when puerperal fever as such does not exist, they cannot be found."

We are not attempting to maintain the germ theory of this disease. We have not the slightest disposition to censure Dr. Barnes for not accepting it. There are several links wanting in the chain of evidence sustaining it, and some very good men, besides the author of this book, cannot yield assent to it. But he is open to censure for this unfair treatment of the subject, and for this partial statement of evidence. Every purchaser of his book has a right to expect in it a full statement of the facts bearing upon, and the opinions of the latest authorities in regard to it, such a presentation as has been admirably made to the profession of this country by Dr. Lusk.[2] It is a great subject; it contains within it the solution of problems of vast import; it certainly projects, as on a screen, some of the features of the pathology of the future. To see it thus treated in a slip-shod and unscientific manner is a most bitter disappointment, and thus to treat it is unworthy of the author's reputation.

Connected with the relation of puerperal fever to the zymotic diseases there is one doctrine prominent in British obstetrical authorities which it is difficult to harmonize with the experience of the profession of this country. It is the far greater importance assigned to scarlatina as a cause of the disease. This is very far beyond anything recognized here. Thus, in Dr. Barnes's work, we read the astounding statement that

"If we can prevent scarlet fever only, we shall have diminished the number of puerperal fever cases by at least half."

[1] Our Present Knowledge of the Relations between Microörganisms and Puerperal Fever By Carl Somer, M.D., Assistant at Gynecological Clinic of Prof. Schröder. American Journal of Obstetrics, July, 1884.

[2] American System of Medicine; by Pepper; vol. i., art. Puerperal Fever.

The question immediately suggests itself how this statement can be reconciled with the proportion of women who must have had this disease in infancy or childhood. A further investigation of the subject shows it to be one of hopeless confusion, supported by wretched logic. Both of these statements can be substantiated from the pages of this work. Thus it is assumed by Hicks, and quoted here without dissent, that a woman may have been exposed continuously for months to the contagion of scarlet fever and still the disease not manifest itself until four or five days after labor. Again, the fact that a woman may have had the disease before, is only spoken of here as a "modifying influence" of its course in childbed, and no mention is made of the fact that a second occurrence of one of the exanthemata is an exceptional occurrence. Still, again, the most singular position is taken that there may be scarlet fever in the puerperal woman, with all its characteristic symptoms lacking:

"Thus, the rash may not be observed, at least not in its usual characteristic manner. McClintock notes that in several cases the eruption was rare in showing itself. Sore throat is probably rarely wanting altogether, but McClintock says the affection of the throat was comparatively slight in all the cases; he thinks this exemption is a remarkable feature. Braxton Hicks also found the sore throat slight in all cases. He adds—and we have made the same observation—that the influence of scarlet fever may be shown without the rash or sore throat, but its scarlatinal origin may not be indicated by the other usual characters."

It is well known that a scarlatinal eruption sometimes occurs in children shortly after they have been submitted to a surgical operation. It has been found in many cases impossible to account for this eruption by any exposure to contagion, while some of the symptoms characteristic of scarlet fever being absent, some other explanation of the efflorescence was demanded. That explanation has been found in attributing the scarlatinal eruption to septicæmia. This explanation has been accepted by very high authorities, by Mr. Holmes,[1] by J. Lewis Smith,[2] and even by Braxton Hicks,[3] in the case of his own son, although he is one of those who can see scarlatina in puerperal women with all its characteristic features lacking.

Now why not call this fever of childbed accompanied with a scarlatinoid rash septicæmia. Those who insist upon it being scarlatina are driven to the most illogical positions. Thus, Browne, in the paper just quoted, in accounting for such a rash after a surgical operation, found that "the child's cousin had suffered from scarlatina three months previously!" But we have here only to deal with Dr. Barnes. He is not always logical. For instance, he attributes (p. 712) frequent sudden death of newborn children "under symptoms of eclampsia and trismus" to puerperal fever prevailing in the hospital, when it would be more in accordance with reason and experience to trace the diseases of both mothers and children to bad hygienic surroundings, of which the diseases were certainly proof. But, in regard to the question under consideration, the following, to which we furnish the italics, is of interest, as coming from an author who teaches the possibility of *auto*-infection:

[1] Scarlatina and simulating Eruptions following Surgical Operations, by J. W. Browne, B.A., M.D., M.R.C.S. Eng. A paper read at British Medical Association, 1885. British Medical Journal, October 10, 1885.
[2] System of Practical Medicine; by Pepper; vol. i., art. Scarlet Fever.
[3] British Medical Journal, June 4, 1870.

"Fever may be propagated to the woman before or after labor by the medium of the husband, or other person coming into close relation, the person serving simply as a carrier. We saw a case of puerperal fever in a London suburb, the conditions of which were subjected to careful investigation. The conclusion arrived at by three physicians was that the infection was communicated by the husband, *who had been working in the garden*, which had been made up of foul rubbish. He himself had felt unwell, *but exhibited no characteristic symptoms*. In this case the poison *may have been typhoid or scarlatina*, but this could not be determined."

But Dr. Barnes has seen these cases of scarlatinoid septicæmic eruptions. The italics of the following are his own.

"We have seen cases of *scarlatinoid rash* breaking out in puerpera, that seemed to be analogous to the similar eruptions observed in surgical patients by Paget and others. It is obviously difficult to differentiate these from scarlatina in the lighter forms, and from erysipelas."

Then why does he not go on and state upon what principles he calls one case without sore throat and eruption scarlatina, and another, with eruption, *scarlatinoid?*

Again: scarlet fever in the puerperal woman is a much more severe and dangerous disease than ordinary. He has seen "several cases recover," but it is generally fatal.

"The patient may die before any tissue changes of an inflammatory or suppurative character have been developed. But if she survives some days, and the case does not end in defervescence and cure, the most grave alterations —as peritonitis, synovitis, cellulitis, carditis, pneumonia, pleurisy, ophthalmia proceeding to destruction of the eyeball—may ensue."

The question forces itself for solution: Are such results, especially those affecting the eyeball, more frequently seen from the influence of scarlatina, or as parts of septicæmic and pyæmic disease?

We cannot continue the subject of puerperal fever, or examine any more of the individual divisions or chapters of the work, but will try to present some of its general features, especially in reference to the needs of the student. It would be extremely agreeable to say that the book compensated in this respect for the shortcomings of the parts we have gone over. But no very close reading is required to discover that it lacks, in many essential particulars, those qualifications necessary to a good manual for students. There is faulty arrangement of subjects, often a want of clearness in statement of facts, an indefiniteness as to meaning, frequent omission of important points, and a notable lack of precise statement of the author's opinion. These statements can be substantiated from the chapters upon the most practical parts of the subject. As to the first point, the chapter on the management of labor precedes that upon mechanism, a most unfortunate arrangement for the student. Then, under the head of "What to observe in the parturient woman," point after point is stated as if copied from the notes for lectures, without comment or explanation; and then, having got to tying the cord and examining the child, the author goes back again (p. 431) to treat of the second stage of labor. As an illustration of carelessness may be taken, from the same page, the statement that the rupture of the membranes "marks the beginning of the second stage of labor." Of course, Dr. Barnes knows that frequently, and especially in primiparæ, the membranes break hours before pains begin, and in another place he

says so, yet here we have the unqualified statement; and again (p. 741), he says, "generally the signs of dystocia will not be long deferred after the rupture of the membranes." Both statements are incorrect and misleading.

It would be difficult to find anything less clear, indeed more confusing, to the student, than the author's statements as to the positions. So contradictory are they, that it would be utterly impossible for any one to learn the subject from these pages, and so frequently repeated that no explanation can be framed to account for them. Thus, the subject is opened (p. 506) with the statement that the *first position* is the *right occipito-posterior*, and is the most frequent; "the forehead is directed to *the right sacro-iliac joint!*" The *left occipito-anterior* is the second position, and "the forehead is directed to the left sacro-iliac joint." Then:

"The simplest formula for enumerating the head positions is to carry the occiput round the circumference of the brim from *right* to *left*, beginning with the left occipito-anterior position. This, then, occiput to left foramen ovale, being by far the most frequent, is No. 1. Taking the occiput over to the right, we get No. 2."

On page 512, occiput to left foramen ovale is again called first position, but on page 515 a cut of Braune's frozen section is given, showing "*left* occipito-anterior position; head engaged in *second* position." The cut shows the latter in contradiction to the text. On page 507, again, the first position is stated to be R. O. A., and the second L. O. A.!

These errors are too numerous to be accounted for by faulty proof-reading, and, as before said, no explanation presents itself. Whatever the source of them, their presence renders it impossible for the student to acquire here an understanding of one of the most essential parts of obstetrics.

In the chapter upon the management of labor we find no directions for making up the obstetric bed. It may be said that this is the nurse's duty. So it is; but the student should be taught how it is to be done, for as a young practitioner, not one in ten of those he attends will have a professional nurse, and he will find that in real life his success will depend more upon making his patient comfortable, than upon his knowledge of the Cæsarean section. Having anticipated a reply as to the bed, let us look at the following, under the head of care of the recently delivered woman. It is as to "cleansing the genitals" with a solution of carbolic acid.

"The fluid should be squeezed out of the sponge, so as to run in streams over the part. *The labia majora and minora may be held gently apart to let any clots escape from the vagina.*"

Nothing is said here about the nurse doing this! A few years ago we were gravely informed in an English hospital that the side position was preferred for obstetrical and gynecological examinations, because that on the back was indelicate! We should like to know if the above is now a feature of English midwifery.

There is no subject, the treatment of which by Dr. Barnes is more unsatisfactory, than the important one of intrauterine injections. Decried by some as a measure of treatment, held by others to be indispensable even in a prophylactic sense, its possible dangers recognized by all, it

deserves from every writer on obstetrics for students most careful directions as to mode of administration. We find but few such here. In one place it is said that since the operation involves some disturbance of the patient, "the physician will do well to carry it out himself." In treating of the prophylaxis of puerperal fever he makes a strong plea for their use:

"Should there be the slightest rise of temperature and pulse this intrauterine injection is imperative. Those who have used it can tell of temperature and pulse reduced, rigors and other signs of toxæmia subsiding after each injection, and ultimately enabling the patient to pull through the most threatening illness."

The author, in his faith, goes a good way beyond any one who will read his book, as he goes beyond all scientific evidence, when he says:

"Some small portion of the carbolic acid or sublimate penetrates the substance of the uterus, and is absorbed into the system, *chasing and neutralizing any poison that may have entered.* Thus we follow the enemy through the gate which admitted it."

Now, turning over just two pages, we come to the treatment of puerperal fever, and there find the following, the first sentence of which is excellent:

"If, after having once well washed out the uterus, and ascertained that there is no offending substance in it, and yet the fever gets worse, it will generally be better not to repeat the injection. . . . It may, as Braun says, do more harm than good. It is necessary to remember that even injections of plain water may cause death. As we have seen when discussing the use of injections to restrain post-partum hemorrhage, sudden death from shock has occurred. The addition of iodine, carbolic acid, or bichloride of mercury, to injections in puerpery, does not neutralize this danger. Convulsions have followed. Carbolic poisoning has been noted."

What young practitioner, with this array of horrors before him, would ever dare to resort to intrauterine injections? And there is not a word of direction given, in connection, as to how to avoid accident. The plea may, of course, be made that duty compels warning as to the dangers of this measure. Granted. Then turn back to page 594 of this book, on the treatment of post-partum hemorrhage, and read without qualification, without comment, without warning, that *turpentine* "might be usefully injected into the uterus." It would be satisfactory to learn how many times Dr. Barnes has carried this measure into execution.

There is plenty of material to continue, but it is not necessary. We had noted a good many points relating to the subject of labor which cannot be entered upon; one or two points may be mentioned. Should a second edition of this work ever appear, we trust the author will enter a little more at length into the matter of changing face into occiput presentations by pressure of two fingers on the forehead. It is treated of here (p. 523) as if it were a very easy affair. So, also, we should like to learn more about helping the chin, in face presentations, to rotate forward, by "gentle traction" made by the finger in the child's mouth. "A very little force," it is said, will sometimes effect this, but upon what part of the mouth it is to be exerted is not said. Sometimes in medicine the *post hoc* is mistaken for the *propter hoc*, but we should scarcely

expect to find Dr. Barnes guilty of the error. Beyond and above all, the author should present to the profession the evidence upon which he bases the advice to wait upon Nature in so serious a matter as transverse or shoulder presentation. Nothing, except actual perusal, ought to satisfy any one that an obstetrical teacher in the position of Dr. Barnes could give such advice. It is to be found on page 553.

"But the practical question will arise, Is spontaneous version so likely ever to occur that we shall be justified in trusting to Nature? Ample experience justifies an answer in the affirmative."

Would it be too much to ask, in the interest of the student, for some portion of this ample experience, and also for some directions as to how long to wait upon Nature for delivery under circumstances where every other writer on obstetrics teaches that the prompt and effective intervention of art is an imperative duty?

Books, like letters of introduction, should be closely scanned for what they do not contain. There is an omission from this one as notable as it is surprising. The work contains not a word in regard to the administration of anæsthetics in natural labor. Indeed, this class of remedies receives but scant recognition, even for pathological conditions. Thus, in regard to treatment of rigid os, we have the following paragraph, in which is again illustrated the author's peculiar manner of emasculating his statements by qualifications:

"Chloroform is often of signal service. It acts by annulling the sense of pain, and by restoring the equilibrium of the nervous system. . . . The sphincteric spasm relaxes, the body of the uterus contracts as it ought to do, and the labor proceeds. Tincture of opium or Hoffman's anodyne in half drachm doses, separately or combined, are almost equally efficacious. Chloral is sometimes superior to opium. It produces unconsciousness without stopping uterine contractions."

This is more than is said of chloroform in any other portion of the book, if not more than is said of it altogether, except in the treatment of eclampsia. In the above quotation is found, too, all that is said of chloral, except statement of dose, or that it may be administered *per rectum*. When we come to relaxation of the perineum, we find only the statement that "chloroform or nitrite of amyl may help by subduing voluntary expulsive effort." The author, who, it will be remembered, is a teacher of the dangers of auto-infection, does not hesitate to recommend a resort to incisions, rather than to chloroform, in order to obviate the resistance of the perineum. There is not a word as to producing anæsthesia for such manœuvres as changing a face into a cranial position by passing the hand into the uterus; nor is there anywhere through the book any adequate appreciation of the value of anæsthetics. The case is still worse in regard to the alleviation of the suffering of natural labor by chloroform. The only words upon the subject are contained in directions for the management of the first stage and direct its denial.

"If the patient or her friends call out for chloroform, evade complying during this stage." P. 431.

The help, it "*may*" be for the perineum, has already been given, and this is all. So one of the greatest boons ever given by art to suffering woman, one of the most efficient promoters of the relaxation of cervix and perineum, and the crowning glory of modern obstetrics, is utterly

ignored. Knowing that Dr. Barnes stood among the opponents of the introduction of chloroform into midwifery, and that he was one of the antagonists of Simpson,[1] we did not expect from him an enthusiastic support of obstetrical anæsthesia. But we have a right to ask him to reconcile his silence in regard to anæsthetics with the statement (p. 415) that "pain is in its essence pathological." We would not have found fault with him had he openly opposed their use, giving his reasons therefor in a manly, straightforward way, but to ignore one of the most important features of modern midwifery, to shirk its consideration, is unworthy of the position he has assumed as teacher of the art, unworthy of a representative of the country which gave chloroform to the world. The skilful administration of chloroform in labor is no trifling matter; the conditions under which it is most effective are known, its influence for good is immense, its injurious action possible, its alleviation of suffering is often like a charm. Yet the student will look in vain here for instruction as to this agent *in any* of its aspects.

This book exhibits in a marked degree some of the personal characteristics of the author. One stands preëminent above all the rest—personal vanity. The preface having stated what portions were the work of the son and of the father, the ordinary mode of expression of authors was sufficient. We have, however, "Robert Barnes" repeated throughout the book to such an extent that it becomes trying to the nerves, and when this occurs four times in a single page the query forces itself whether it would not have been better to make a running head page-line of the name. In not a few instances it is fairly dragged in. This characteristic of the author reaches the culminating point when he attaches his own name to parts concerned in the process of parturition. Thus, in this work, we have, for the first time, "Barnes's curve." This is a small section of a circle drawn around the sacral promontory. In the author's "Obstetric Operations" it is called "the curve of the false promontory." Now, in importance it is ranked with Carus's curve. Yet it cannot be a curve in the sense, nor to the extent, that the curve of Carus is, because the lower limb cannot be projected backward. Still, that there may be an arc figured here sufficient to attach a name to, if one is so disposed, cannot be disputed. Again, the two straits of the soft parts, the cervix and the perineum, it pleases Dr. Barnes to call "valves." Their resemblance to valves is certainly strained, and he gives a cut (Fig. 113), which is a gross exaggeration, of the lower segment of the uterus and of the perineum, capping the head. These are not only "valves," but they are "Barnes's valves," "Barnes's uterine valve," and "Barnes's perineal valve," and the reader finds them frequently. Many parts of the human body bear the name of some anatomist, and several diseases are known by the name of their discoverers. Such honor has been merited. But thus to perpetuate a name is only an honor when it has been conferred by general consent of the profession. For an author to assume it to himself is offensive vanity. There is another curve of parturition not yet named, that which the head makes back of the perineum after delivery in occipito-posterior position, a curve which Dr. Barnes speaks of; we can, therefore, only express surprise that he did not name this, that he did not call one "Robert Barnes's curve," and the

[1] Dutertre, De l'emploi du Chloroform dans les Accouchements Naturels, Paris, 1882.

other "Fancourt Barnes's curve." So, too, the one name might have been affixed to the uterine, and the other to the perineal "valve."

We regret that we have been compelled to present this work to our readers so unfavorably. But facts enough have been given to enable them to judge for themselves. If our disappointment has been great, it is because expectations were high. The work is not worthy of the high reputation the author had already honestly won. It will not aid in elevating the reputation of the obstetric literature of his country. It will not, as did the *Obstetric Operations* influence beneficially obstetrical teaching and practice. Much less will it mark an epoch in either the science or the art of which the author is a teacher. When, in the future, the historiographer shall trace the stream of obstetric literature, no part of its course will be marked by a "Barnes's curve." J. C. R.

A TEXT-BOOK OF PHARMACOLOGY, THERAPEUTICS, AND MATERIA MEDICA. By T. LAUDER BRUNTON, M.D., D.Sc., F.R.S., Assistant Physician and Lecturer on Materia Medica at St. Bartholomew's Hospital. ADAPTED TO THE UNITED STATES PHARMACOPŒIA, by FRANCIS H. WILLIAMS, M.D., Boston, Mass. 8vo. pp. 1035. London: MacMillan & Co. Philadelphia: Lea Brothers & Co., 1885.

UNTIL recently the study of the action and uses of medicines was necessarily confined to the clinical method. The reasons are obvious. The chemistry of the substances which act upon the body, and of the organs upon which they act, had to be ascertained to a certain extent; and the functions of the parts of the body, as well as their relations to one another, had to be determined before it was possible by the experimental method of research to elucidate the nature of the alterations of functions produced by drugs. But although pursued only within recent times, this method, in consequence of the zeal of pharmacologists, has already investigated the physiological action of most drugs, and imparted to the materia medica a truly scientific character. Some of the knowledge so laboriously gained has found its way into the practice of the day; much of it, however, has not as yet been fully appreciated by the profession, doubtless on account of the difficulty of applying it without a very accurate knowledge of the normal functions and the nature of the alterations they undergo in disease.

A work which should present a complete yet terse account of the knowledge thus far attained, and at the same time show its relations to physiology and pathology, has been desired by the practitioner. We hope he will find it in this book, to which we wish to call his earnest attention.

More than fifteen years ago, says the author in the preface, he had prepared a work on materia medica, but delayed its publication in order to make some improvements and remove some redundancies. He soon found so many uncertainties regarding the action of drugs that he determined to settle them by experiments. The labor grew unexpectedly; and from greater experience as a teacher and examiner, he came to the

conclusion that the plan of the work might be altered with advantage, and so threw aside the original manuscript and entirely rewrote the book.

In the original work he had discussed the physiological and therapeutical actions of each drug separately in the same way as in the third part of the present work, though on a more extended scale. But considering that the physician requires rather a knowledge of drugs and of the manner in which the actions of the individual members of a class differ from one another—in fact, a knowledge of the ways in which the various functions of the body can be influenced by drugs both in health and disease, he determined to devote a complete section of the work to a discussion of the methods by which the action of drugs is ascertained; to the manner in which each function can be modified by drugs; and to the *rationale* of the use of drugs in disease—*i. e.*, to devote a section to general pharmacology and general therapeutics.

The author thus apologizes for the long delay in the appearance of his work, and gives the reader some idea of the time and labor devoted to its production. The most superficial examination of the first part of this work will convince anyone that it was the product of extensive reading, numerous original investigations, and conscientious examination of the researches of others in the same field.

The terms used in the title are defined as follows:

"By materia medica we understand a knowledge of the remedies employed in medicine. This knowledge may be subdivided into several divisions: Materia medica proper, pharmacy, pharmacology, and therapeutics.

"By materia medica proper we mean an acquaintance with the remedies used in medicine, the places whence they come, the crude substances or plants which yield them, the methods by which they are obtained, and the means of distinguishing their goodness or purity, or of detecting fraudulent adulteration.

"By pharmacy we mean the methods by which drugs are prepared and combined for administration.

"Pharmacology is a knowledge of the mode of action of drugs upon the body generally, and upon its various parts. It is of comparatively recent growth, but it is now one of the most important subdivisions of materia medica.

"By therapeutics we understand a knowledge of the uses of medicines in disease."

It is evident that the author uses the term pharmacology in a more limited sense than is usual at the present time, and that the term materia medica in the title embraces only what is contained in the definition of materia medica proper.

General pharmacology and general therapeutics are discussed in the first section, consisting of twenty chapters and occupying 392 pages. The first chapter is concerned with the general relations between the organism and substances affecting it, and the second with the circumstances which affect the action of drugs on the organism. Beginning with the third chapter, the actions of drugs are discussed in the following order: On protoplasm, blood, and low organisms; invertebrata; muscle; nerves; the spinal cord; brain; organs of special sense; respiration; circulation; the surface of the body; the digestive organs; tissue changes; excretion; the generative system. The last four chapters of the first section are devoted to a consideration of the methods of administering drugs; antidotes; antagonistic action of drugs; and dosage.

From this enumeration of the heads of the chapters, it is apparent

that the actions of drugs are systematically traced from the most elementary substances and organisms up to the most complicated organs and systems. Having observed in his capacity as teacher and examiner that students find it difficult to apply physiology to pharmacology and therapeutics, and that most men forget those parts of physiology which they are not constantly studying, the author has given an account of the normal functions of the different parts of the body before proceeding to discuss the alterations which are produced in them by drugs, or which they undergo in disease. The discussion of the action of drugs is accompanied with a description of the methods of experimenting; and the instruments used, anatomical and physiological *data*, and modes of action of drugs are illustrated by carefully executed diagrams. And where it seemed necessary in order to render the use of medicines in disease more intelligible, the discussions of the actions of drugs are interspersed with brief explanations of pathological questions. The uses of medicines or groups of medicines acting upon any organ or system, are fully considered, and, where necessary, the special uses of members of groups are pointed out.

No space is devoted to historical *data*, except in the brief history of anæsthesia. It is pleasant to find that here, also, the author exhibits a thorough familiarity with his subject. He accords to Dr. Crawford W. Long, of Athens, Georgia, the honor of having first produced anæsthesia by the inhalation of ether. This physician, in 1842, successfully anæsthetized a patient in order to remove a tumor. Horace Wells, in 1844, employed nitrous oxide gas as an anæsthetic. Morton, in 1846, at the suggestion of the chemist Jackson, produced anæsthesia with ether, without knowing of its previous use by Dr. Long.

Section II. treats of general pharmacy. It discusses the groups of pharmaceutical preparations which are officinal in the U. S. P. of 1883, and the B. P. of 1874. The officinal names of preparations are tabulated, and opposite each name is placed the ordinary small and large dose. These lists the author intended merely for reference, and not to be learned by heart by any student. Indeed, he protests against the injustice of demanding too much from the memories of students. On this account, also, he does not mention the composition of the preparations, except the infusions and various compound pills. But, for this very reason, namely, that the memory cannot retain the composition of pharmaceutical preparations, except in few instances, a text-book should not omit it. Every practitioner, when he prescribes large doses of a preparation which, in excessive quantities, may produce disagreeable or toxic effects, feels the necessity of knowing the quantity of the crude drug which it contains; and he will frequently consult his text-book, because he cannot retain such knowledge. There is a still more weighty reason why a text-book adapted to both the U. S. P. and the B. P. should contain an account of the composition of all the important preparations. In some instances the composition of the same officinal preparation differs very markedly in the two pharmacopœias. Thus, the tincture of aconite root of the U. S. P. contains one part in two and a half, while the tincture of aconite of the B. P. contains one part in eight. The dose of the former is stated in the section on general pharmacy to be from 1–3 minims, and that of the latter from 1–10 minims. But in the article on aconite, in the section on the vegetable materia medica, no mention is made of the

tincture of the U. S. P., and the dose of the tincture of the B. P. is stated to be from 1–5 minims.

A similar difference exists in the composition of the tincture of belladonna in the two pharmacopœias. The tincture of the U. S. P. contains one part in seven; the tincture of the B. P., one part in twenty. In the article on belladonna, the dose of the U. S. P. tincture is 8–30 minims, and that of the B. P. 5–30 minims. No serious results will follow from the maximum dose of the United States tincture; but the British practitioner may be sorely disappointed by the feebleness of his preparation.

Sections III., IV., V., and VI. discuss respectively the inorganic materia medica, organic materia medica, vegetable materia medica, and drugs derived from the animal kingdom.

Three indexes complete the work: a general index, an index of diseases and remedies, and a bibliographical index.

Having thus indicated the general arrangement and scope of this work, we will examine a few parts more closely; and, as it is intended for practitioners as well as students, we will pursue the course which the former will adopt in seeking for information regarding the action and uses of the more important medicines.

We will select, first, the most important drug of the materia medica—opium. It was long ago established by empirical observations that opium produces sleep, relieves pain, and causes constipation. But how these effects are brought about was not known until its physiological action was investigated by the experimental method. Theories, or rather hypotheses, were indeed entertained, which, for the most part, have been found erroneous, and, in so far as they were permitted to influence the therapeutic uses of opium and other hypnotics, impeded the advance of rational treatment.

Opium is fully considered in the section on the vegetable materia medica, and is referred to some twenty-five times in the section on general pharmacology and therapeutics. To ascertain the mode in which it produces sleep, it is necessary to consult the chapter on the action of drugs on the brain. There we find that opium and morphine "seem to act by depressing the functional activity of the brain itself, although along with this depression an anæmic condition of the organ sets in." Doubtless every reader knows that only a short time ago it was taught that hypnotics act by producing cerebral anæmia. This theory was founded on the fact that some of the early observations on the brain by trephining appeared "to show that during sleep, whether it has come on naturally, or has been induced by narcotics, such as a small dose of opium, the brain is anæmic." The effect was mistaken for the cause. Every organ, but especially the brain, when functionally active, is freely supplied with blood; but when the activity ceases, soon becomes anæmic. Hence, the brain under the depressing influence of opium soon becomes comparatively bloodless. In recent careful observations the brain was not anæmic during the sleep induced by hypnotics, unless the sleep had continued for some time. Thus Binz (*Arch. f. exp. Path. u. Pharm.*, Bd. vi. p. 310) observed in animals that the sleep induced by chloral or ether was not accompanied by an anæmic state of the brain. But after the sleep had continued for some time the surface of the brain became pale. The anæmia thus resulted from the inactivity of the brain, and was not the direct effect of the hypnotic. This observer also found that thin sections of brain, exposed to the action of very dilute

solutions of chloral for several hours, presented a marked alteration in appearance, the cells having become darker and more granular, and the nuclei more sharply defined. Morphine, chloroform, ether, bromine, chlorine, iodine, and ozone, produced a similar change in thin sections of brain. Binz supposes that hypnotics cause an exceedingly feeble and transient coagulation of the protoplasm and nuclei, during which the brain cells are unable to perform the functions of the waking state.

The mode of action of hypnotics is of much importance. A few years ago it was held by eminent writers on nervous diseases that bromide of potassium induces sleep by rendering the brain anæmic, and that, since it causes cerebral anæmia, it would prove a useful medicine in cerebral hyperæmia and inflammation. Soon after this theory came into vogue, some physicians supposed that meningitis might be favorably influenced by the use of large doses of bromide of potassium.

How does opium cause constipation? It has been long supposed that opium arrests peristaltic movements of the intestines, and this view seems to have been fully confirmed by experimental researches, which have also cleared up the manner in which it may modify peristalsis. The author, in the chapter on the action of drugs on the digestive system, gives a pretty full account of Nothnagel's experiments, by which it seems to have been proved that moderate doses of morphine arrest peristalsis by exciting the inhibitory fibres of the splanchnic nerves. Large doses may have the opposite effect, and thus increase peristalsis. Opium eaters, who consume large quantities, are generally not constipated.

While the constipating effect of ordinary doses of opium and morphine have been observed for centuries, it has not heretofore been known that very minute doses, in certain pathological states, may promote peristalsis, and thus overcome constipation. We owe this important observation to Drs. Littlejohn and Brunton. Dr. Littlejohn noticed in a case of ovarian tenderness that half a grain of opium, given to relieve the pain, acted as a purgative. It occurred to Dr. Brunton that in such a case the constipation might be due to reflex irritation of the inhibitory nerves by the tender ovary. It seemed probable that small doses of opium would lessen the action of the inhibitory nerves and divert the stimulus from them on to the stimulating fibres, and thus produce purgation instead of constipation. One drop of tincture of opium was given in a teaspoonful of water at night. This dose was not only sufficient in most cases, but in one case proved excessive, doing no good, while half a drop acted as a brisk purgative. He supposes that opium used in this way will not act as a purgative in cases of constipation depending upon general insensibility of the intestinal nerves. The cases in which it is most useful are those of delicate women of a nervous temperament, suffering from ovarian pain, and, in whom, ordinarily, purgatives produce excessive action followed by constipation.

Quinine is a medicine of very great power. In malarial affections it quickly arrests the paroxysmal attacks of fever or pain, in many febrile diseases it lowers the abnormally high temperature, and in cases of general debility frequently aids greatly in restoring the normal vigor. Hence it is often used, and sometimes abused. It is, therefore, of great importance that the student acquire clear ideas of its mode of action, of the indications for its use, and of the appropriate methods of administration.

How does it cure malarial fevers? The author discusses its mode of action as an antiperiodic in the chapter on the action of drugs on protoplasm, blood, and low organisms. He defines antiperiodics as "remedies which lessen the severity or prevent the return of attacks of certain diseases which tend to recur periodically." The mode of action, he says, is not definitely settled, nor yet is the pathology of the diseases which they prevent. Still there is considerable evidence for considering that malarious conditions are connected with the presence of a bacillus. The periodical return of the attacks is probably caused by the growth of successive crops of these pathogenic organisms, and antiperiodics may be supposed to interfere with their development. The mode of using quinine in malarious affections is described on p. 801, where the author says: "It should be given in doses of three or four grains, three times a day, or in a single dose of ten grains, just before the fit comes on; it will often cut short a fit of moderate intensity. An emetic or cholagogue should be given before it." The reason for the last advice is that quinine forms with bile a salt which is sparingly soluble, and hence the presence of bile may interfere with the absorption of quinine. From the small doses recommended, it is evident that the author refers to cases of moderate intensity. It is doubtful whether ten grains, given just before the fit comes on, will notably lessen its severity. To accomplish this, or to prevent its coming on at all, we would suppose it necessary to give the dose more than three hours before the expected paroxysm, in order that there may be sufficient time for complete absorption.

How does quinine lower febrile heat? Antipyretics are discussed in the chapter on drugs acting on tissue change. There it is stated that antipyretics act either by lessening the production of heat or by increasing the loss of heat, and that quinine acts in the former manner—that is, it diminishes tissue changes. For the evidence establishing this fact the reader must consult the chapter on the action of drugs on protoplasm, blood, and low organisms. Under the head of general action (p. 799) the results obtained experimentally are briefly stated, from which it is seen that quinine combines with *albumen*, rendering it less soluble and more coagulable; that it lessens *protoplasmic* and *amœboid movements*, and destroys low animal and vegetable organisms; that it diminishes *oxidation;* that, in large doses, it arrests *fermentation*, especially when it depends on organized ferments; and that it is a powerful antiseptic. Under the head of uses of antiseptics (p. 106) it is said that "antiseptics are chiefly employed in febrile conditions, in order, if possible, to lessen the growth of the septic organisms and to remove the danger to the individual which the fever itself would occasion." Under the head of uses (of quinine), p. 802, the author says: "As an antipyretic, large doses (five to twenty grains) lessen the temperature in typhus, enteric, and other fevers. It is better to give a single large dose once a day, or two doses of five grains, given in the same hour, between five and six in the evening." The doses recommended may be efficient in light cases; but we have never observed any notable effect, when the temperature was 105° F., from doses less than twenty grains. The author holds that quinine should always be given in solution, as, when given in the form of powder, some of it passes out in the feces.

How does quinine act as a tonic? Tonics are defined (p. 356) as "remedies which impart permanent strength to the body, or its parts." And according to their mode of action "they have been divided into

blood tonics or hæmatinics, vascular tonics, gastric tonics, intestinal tonics, and nervine tonics." The author nowhere gives a satisfactory explanation of the mode of action of quinine as a tonic. On page 800 it is said: "In man small doses give tone to the system generally." But how this happens no one knows. Perhaps the physiological action of quinine on the stomach is held to be a sufficient explanation. Of this the author says: "When taken into the stomach small doses increase the appetite, especially in atonic dyspepsia, but if the stomach is irritable quinine causes loss of appetite, and may produce nausea and vomiting (p. 319). If the stomach be congested, the flow of mucous secretion will be increased by quinine." It is evident that quinine, when it increases the appetite, and thus indirectly causes more food to be digested, will invigorate the system generally; but that it can give tone to the system generally, when it does not improve the digestive process, is extremely doubtful. Many physicians, however, give small doses every two or three hours, in various diseases attended with debility, in order to give tone to the system generally.

Digitalis, and medicines acting like it, produce striking effects in certain cardiac affections. While digitalis does much good in cases to which it is adapted, in others it may do great injury. In some forms of dropsy it displays remarkable power, in a few days causing the dropsical swelling to disappear; in other forms it is powerless, and if given in large doses, or for a long time, may produce sudden death.

On account of these decided therapeutic and toxic properties, the physiological action of digitalis has been investigated by numerous observers; and it is perhaps as well ascertained at the present time as that of any drug. All experimenters have noticed that digitalis readily slows the pulse in healthy persons; but in febrile diseases this effect is not so easily produced, and sometimes it cannot be brought about. For many years it has been known that digitalis slows the pulse by stimulating the vagus nerves, the inhibitory nerves of the heart. But it was not understood why it should exert less power in febrile affections than in health. While this work was passing through the press, Dr. Brunton made some experiments which appear to show that a very high temperature has a depressing effect on the vagus centre in the medulla oblongata as well as on the ends of the nerve in the heart. It does not completely paralyze but greatly weakens them, so much so that digitalis and probably all drugs which act like it, such as adonidin, no longer slow the pulse as they do at normal temperatures.

The diuretic action of digitalis has been studied with great care. In some diseases, especially in cardiac dropsy, a very marked increase of the urine occurs; but in hepatic and renal dropsy little or no change takes place in the quantity of the secretion. It is generally held that digitalis is active in cardiac dropsy, because it increases the energy of the heart's contractions, thus augmenting the quantity of blood thrown into the arterial system; and that it fails in all cases of dropsy in which the blood-pressure is at its normal or maximum height. For this reason also, it is supposed, no diuretic action is displayed in healthy persons. Brunton, however, found in his own person a decided increase of the urine when he took large doses, so as to produce symptoms of poisoning. In cases of poisoning by digitalis, the author says, a marked diminution in the flow of urine frequently precedes a fatal issue, and he and Mr. Power found, after injecting digitalis into the veins of a dog, that the

secretion of urine became entirely arrested when the blood-pressure reached its maximum, and again commenced when the blood-pressure began to fall. While the urinary secretion becomes diminished, as a rule, both in men and animals when symptoms of poisoning supervene, it was markedly increased in Brunton's own person. He explains this discrepancy by supposing that in his own case the blood-pressure was low. It follows, of course, that digitalis may be used as a diuretic whenever the blood-pressure is low, and that it should never be used when the blood-pressure is abnormally high.

Brunton agrees with most authors regarding the cumulative action of digitalis, but his explanation of it can hardly be regarded as satisfactory. He discusses cumulative action in the chapter on the circumstances which affect the action of drugs on the organism. He says cumulative action

"may be due to arrest of excretion, as in the case of the two active vegetable principles, digitalin and strychnine. After moderate doses of these drugs have been taken for some time, it is found that instead of the effects they produce increasing gradually, as we would expect from a gradual accumulation in the blood, the symptoms of poisoning become suddenly developed in somewhat the same way as if the dose had been suddenly increased. It is evident that a diminution in the quantity excreted will produce this effect as rapidly as an increase in the quantity taken, and this is probably the true cause of the phenomenon. When digitalin has been taken for some time and accumulated to a certain extent in the blood, it causes a diminution in the amount of urine excreted, and this diminution is either accompanied or quickly followed by the other symptoms of poisoning."

But the diminution of the urine excreted does not prove defective elimination, nor accumulation in the blood. Were it possible to detect digitalin in the urine, and to determine accurately the time required for its complete elimination, it might possibly be shown that defective excretion is the cause of the cumulative effects. But no one has yet succeeded in finding digitalin in the urine. Dragendorf carefully examined the urine of dogs poisoned with digitalin, but only in a few instances succeeded in detecting a trace of the poison. Recently Dr. W. Van der Heide (*Arch. f. exp. Path. u. Pharm.*, Bd. 19, p. 125) endeavored to extract digitalin from the urine of animals to which he had given large quantities. But the extracts obtained from the urine did not possess the slightest physiological action on the frog's heart. Nor was he able to determine its presence in the blood. When some of the blood of animals which had received digitalin for some time was transfused into healthy animals, no effects due to the poison were observed. He found that tolerance took place in some organs and not in others, when the poison was administered for a long time. He also found that the pulse of a dog became slower after he had eaten large quantities of the liver, heart, kidneys, and muscles of rabbits poisoned by digitalin. Hence he concluded that cumulative action depends upon the peculiarity of the chemical processes which take place in the organs manifesting cumulative effects, in them the compounds of digitalin with the tissues being slowly formed and slowly disintegrated.

From the foregoing, the reader will see that the author considers digitalis the most useful remedy in diseases of the heart with low blood-pressure, especially in valvular diseases and dilated heart, when dropsy and other symptoms of inefficient heart action are present. The reader

will find in the chapter on the action of drugs on the circulation a very full discussion of the mode of action of digitalis in cardiac affections.

Aconite has been much used of late as an antipyretic in consequence of the laudations of Ringer. Brunton also claims that small doses are very useful in a great number of diseases attended by fever. On p. 699 he says that "the heart is quickly affected even by very small doses, and a single drop of the tincture, given in water, twice or thrice at intervals of a quarter of an hour, will in many cases greatly reduce the rate of the pulse." This applies to the British tincture, which is much weaker than that of the U. S. P.

"This slowness of the pulse is due to an action of the aconite upon the vagus roots, and does not occur after the administration of atropine. In some cases of disease also the pulse seems little affected by aconite. In larger doses the vasomotor centre becomes gradually paralyzed, while the heart remains slow, the blood-pressure falls greatly, and the pulse is not only slow, but exceedingly weak and irregular."

Regarding its therapeutic uses, he says on p. 701:

"Its chief use is in the *febrile condition* depending upon local inflammations, such as tonsillitis, sore throat, pleurisy, pneumonia, phthisis, peritonitis, pericarditis, acute rheumatism, gout, erysipelas, otitis, gonorrhœa, and in urethral fever. In many of those conditions small doses of aconite slow the pulse, lower the temperature, and give much relief to the patient."

These very remarkable effects of small doses of the tincture of aconite (B. P.) seem therefore to be due to its action on the vagus roots, in consequence of which the heart's action becomes slow. It does not directly modify oxidation in the organism, for, in experiments, Brunton and Cash found that the active principle aconitine neither retarded nor accelerated oxidation. The composition of the tincture of the U. S. P. differs from that of the B. P., being one to two and a half, while the latter is one to eight. The writer has frequently employed small doses of the tincture of the U. S. P., giving as much as twenty or thirty drops within twenty-four hours, but never noticed any decided effects either on the pulse or temperature. It is very curious that the tincture of aconite should prove so active in the febrile condition, while digitalis is of little use. Both slow the pulse by stimulating the vagi. The reason assigned for the slow action or non-action of digitalis in the febrile state is that the high temperature depresses the vagus nerves so much that they no longer respond to the action of digitalis. It would seem, therefore, that there must exist some peculiar difference between the action of aconite and digitalis on the vagus roots, or that even in small doses aconite greatly depresses the heart or the vasomotor centre.

It is to be regretted that the author has not discussed briefly the general pathology and therapeutics of the inflammatory process. Is it possible to produce any decided change in the circulation of an inflamed part by slowing the heart's action? That this may be accomplished in the earliest stage, when little or no exudation has taken place, seems reasonable; but will it occur when the inflammatory process is fully established? Doubtless a lowering of temperature in febrile diseases may render the patient more comfortable, and all physicians recognize the necessity of antipyretic measures when the heat as such is a source of danger. But aconite can hardly be considered very useful in high fevers, and in safe doses generally exerts very little effect. From the

references in the index of diseases and remedies, it is evident, however, that Brunton supposes aconite to be useful in inflammatory affections by modifying the circulation in the inflamed parts, for under the heads "Peritonitis," "Pleurisy," and "Pneumonia," aconite is followed by the qualifying phrases "In early stage" and "Very useful in commencement."

The author's explanation of the utility of arsenic in phthisis is highly interesting and deserving of the most serious consideration. On p. 98 arsenic is found in the list of substances the action of which on the spores of anthrax bacilli was determined by Koch. The spores were destroyed in ten days by one per cent. solutions in water. On anthrax bacilli a very powerful action was found to be exerted by arsenite of potassium, 1 part in 100,000 retarding and 1 in 10,000 preventing their development.

Arsenic is included in the class of alteratives, which the author defines as "remedies which improve the nutrition of the body without exerting any very perceptible action on individual organs." Regarding their mode of action, it is said, p. 358, "It is uncertain how they act; it is possible that they may alter in some way the action of enzymes in the body, but it is also possible that they act by replacing the normal constituents of the tissues and forming compounds which tend to break up in a different way from those which are ordinarily present." On p. 360 the author says: "Antimony, arsenic, and phosphorus have a special action on tissue change, and powerfully affect the glandular, nervous, respiratory, and cutaneous systems. In large quantities they affect the liver very markedly, producing fatty degeneration; and this also occurs in other tissues." On p. 608 the peculiar action of arsenic on the skin is described and illustrated. It is shown that the protoplasm of the columnar layer of cells in the epidermis of the frog becomes softened, so that the cuticle can be stripped off the whole body with great readiness. "Other epithelial structures are also affected, and Cornil has found fatty degeneration of the epithelium lining the alveoli of the lungs in animals poisoned by arsenic." To avoid repetition, the author has omitted in the article on arsenic any allusion to the experiments of Binz and Schulz, in which it was found that in the presence of protoplasm arsenious acid is oxidized, and arsenic acid reduced. But he includes arsenic in the group of pentad elements, of which it is said on p. 603, "Living protoplasm has the power of oxidizing all the members of this group, and also of reducing the products of their oxidation (Binz)."

Brunton explains the mode of action of arsenic in phthisis as follows:

"It is now probable that this disease depends on the presence of a *bacillus*. In order that it should grow within the body, however, it is necessary that a suitable *nidus* should be present, and the different susceptibility to the disease of different individuals, or of the same individual at different times, probably depends on their liability to present a suitable nidus. The bacillus tuberculosis differs from such bacilli as the bacillus anthracis in being of very slow growth, so that when it is cultivated artificially on a solid medium, it takes about ten days before it succeeds in establishing itself and begins to grow. Consequently when applied to an open wound, or when inhaled into the lungs of a healthy person, it does not, like the *Bacillus anthracis*, at once begin to multiply and produce disease in the organism, but it is usually removed by washing in the case of a wound, or by expectoration in healthy persons. But if its removal be interfered with, it will produce disease. Thus, if instead of being applied

to an open wound it be injected under the skin so that it cannot be removed by washing, it will, after a time, begin to grow, and produce tuberculosis, first local and then general. It is probable that the case is similar in the lungs. In the healthy lung it finds no nidus, and is removed by expectoration, but if a portion of the lung be consolidated by catarrhal pneumonia, the consolidated part probably affords a nidus to the bacillus, and the longer the consolidation lasts the greater the risk of bacilli finding entrance. In croupous pneumonia the exudation into the alveoli, consisting chiefly of fibrin with a few leucocytes, quickly breaks up and is absorbed, so that it is comparatively rarely followed by phthisis. But the proliferated epithelial cells which fill the alveoli of the lung in catarrhal pneumonia are much more resistant; they break down and are absorbed much more slowly, and hence a much longer time is given during which bacilli may find a nidus. The marked hereditary nature of phthisis is a curious point in a disease which we suppose to depend on the presence of a bacillus, and is a character in which it differs from such diseases as anthrax, ague, or relapsing fever, which are also due to foreign organisms. But the difference probably depends on the slow growth of the tubercle bacillus, which renders a prolonged, undisturbed rest at the point where it enters the body necessary for its further growth. *The disease is not* hereditary, *but the predisposition* to such morbid changes in the lungs as afford a nidus to the bacilli *is hereditary.*

"The more rapidly the effused products in pneumonia can be removed from the lung, the less chance have the bacilli of finding a nidus. It is probable that arsenic, which causes fatty degeneration of the normal epithelial cells lining the alveoli, also causes a similar degeneration of such cells when filling the alveolar cavities. By thus breaking them up and quickening their absorption, arsenic will lessen the risk of bacilli finding a nidus in them and converting catarrhal consolidation into phthisis."

In connection with the action of arsenic in phthisis, it may be of some interest to ascertain the author's opinion of another remedy which is much used in this disease—*cod-liver oil.* In regard to its use in phthisis, he says:

"In phthisis it is of great service, and is used in all stages of the disease, except when the temperature is very high; especially is it useful in the first stage, where there is little consolidation. Under its use the patient gains flesh, keeps the disease in check, and even sometimes becomes cured."

Every physician who has frequently employed cod-liver oil in cases of phthisis has doubtless observed the remarkable action ascribed to it by Brunton. Some physicians, however, suppose that it acts only as a fatty food, and that other forms of fat may be used as well. That this view is erroneous, may be readily demonstrated by the experiment cited by the author: "If you take two loops of intestine, and fill one with ordinary oil and the other with cod-liver oil, and replace them, the one with cod-liver oil will lose more in the same time than that containing ordinary oil." This proves that cod-liver oil is more easily absorbed than ordinary oil. As to the cause of its ready absorption, there exist two views. According to the older view, which is held by Brunton, cod-liver oil contains biliary matters, which promote absorption. It may be readily seen that oils pass more readily through membranes moistened with bile. But it is somewhat doubtful whether cod-liver oil contains bile, since Buchheim and some other observers failed to find it in careful analyses. But even if present, the quantity is so minute that no very decided difference could result therefrom in the behavior of the oil. According to the other, and more recent view, cod-liver oil contains a notable quantity of fatty acids, especially oleic and palmitic. These acids,

coming in contact with alkaline substances in the intestine, form soaps, and thus emulsify the oil, breaking it up into exceedingly minute drops, which are quickly absorbed. That such a fine emulsion is formed when cod-liver oil comes in contact with alkaline liquids, is readily observed in the following experiment: Put a small quantity of a dilute solution of caustic soda (3–1000) into a watch-glass or test-tube; add one or two drops of cod-liver oil. In a few moments a milky liquid appears, which, under the microscope, is seen to consist of minute drops of the oil (Ewald).

It is unnecessary to allude to other remedies in order to exhibit the character of this work. From the quotations, the reader will doubtless have concluded that it is not only profoundly scientific, but thoroughly practical. Indeed, every chapter teems with matter of the greatest practical importance. For the most part, the practical application of drugs is based on their ascertained physiological action; but where scientific research has failed to elucidate the mode of action of remedies, full justice is done to the empirical observations by which nearly all the uses of medicines were discovered. Having carefully examined the work, we think we may justly say that the student will find it a thorough and trustworthy text-book; the practitioner a guide which contains all the real therapeutic information gained by empirical and scientific methods; and the pharmacologist such a masterly exposition of the methods of investigation that he will consult its lucid pages on all occasions. S. N.

A Practical Treatise on Urinary and Renal Diseases, including Urinary Deposits. Illustrated by numerous cases and engravings. By William Roberts, M.D., F.R.S., F.R.C.P. Lond., Professor of Medicine at the Victoria University, Consulting Physician to the Manchester Royal Infirmary, assisted by Robert Maguire, M.D. Lond., M.R.C.P. Lond., and Physician to Outpatients, St. Mary's Hospital, London. 8vo. pp. 609. London: Smith, Elder & Co. Philadelphia: Lea Brothers & Co., 1885.

The appearance of a new edition of Dr. Roberts's well-known and valuable work is an event which will be hailed with pleasure by all who are familiar with the last edition, which has been for some time out of print. From want of leisure, Dr. Roberts has intrusted its revision to Dr. Maguire, who has sought to bring the various articles up to the level of our existing knowledge, while Dr. Roberts himself has almost entirely rewritten those on albuminuria and microörganisms. It is to the former that one probably first turns, for all are naturally anxious to ascertain the views of so mature an observer, and so busy a physician, on so practical a subject. We are met at the outset with the statement that the best tests for albumen are coagulation by boiling and nitric acid. This statement Dr. Roberts makes after having thoroughly examined the recently suggested delicate tests, sodium tungstate, mercuric iodide, acidulated brine, and ferrocyanide of potassium. He believes that the most frequent source of fallacy in their use is not peptone or hemialbumose, but mucin, which, he says, they all throw down in a manner indistinguish-

able, without further testing, from albumen. When the contact method is followed, they yield, if the urine contain mucin, an opalescent zone at the juncture of the two fluids, and they yield exactly the same reactions if the urine contain albumen. For such reasons as these he concludes that we must, for the present, abide by the old tests. Dr. Roberts does not even mention, as a test for albumen, picric acid, so highly valued by Dr. Johnson, and which is claimed by the latter to be free from the objection made to all others as to the precipitation of mucin. It is but fair to state, however, that in this view Dr. Johnson is not sustained by all other observers.

We believe, on the whole, that Dr. Roberts is right in thus giving these tests a second place, for although three of them are more delicate than heat and nitric acid, both for the reason mentioned, and the additional one that they precipitate also the alkaloids, they are not so reliable without precautions which are likely to be overlooked.

We do not think that Dr. Roberts lays sufficient stress upon the fact that uric acid also reduces the sulphate of copper, and therefore may become a source of error in testing for sugar. It is true, as he says, that practically it is very rare that this happens; yet we have known both chemist and physician to be misled by this reaction, and what has occurred once may occur again.

The part undertaken by Dr. Maguire has been well performed. He has in the main succeeded in bringing the various sections to the present state of our knowledge, while the individuality of the book, as Dr. Roberts's production, is not destroyed. Maintaining, as it does, the merits of previous editions, with those improvements demanded by more recent accessions to our knowledge, we predict for the volume the success of its predecessors. J. T.

MINOR SURGICAL GYNECOLOGY. A TREATISE OF UTERINE DIAGNOSIS AND THE LESSER TECHNICALITIES OF GYNECOLOGICAL PRACTICE, INCLUDING GENERAL RULES FOR GYNECOLOGICAL OPERATIONS, AND THE OPERATIONS FOR LACERATED CERVIX AND PERINEUM AND PROLAPSUS OF UTERUS AND VAGINA. FOR THE USE OF THE ADVANCED STUDENT AND GENERAL PRACTITIONER. By PAUL F. MUNDÉ, M.D., Professor of Gynecology at the New York Polyclinic and at Dartmouth College, etc. Second edition, revised and enlarged. 8vo. pp. 552. New York: William Wood & Co., 1885. London: Cassell & Co., Limited, 1885.

IN reviewing any work, great or small, two considerations should be kept before the mind. The first is the design of the work, or the object with which it has been written; the second is the manner, skill, and ability with which the design has been carried out. It is upon these that the whole value of the work depends. The design may be so great and noble as to raise the importance of the mode of execution to the highest; the grander the design, the greater the difficulty of carrying it out. On the other hand, the design may be so mean, mistaken, and faulty as to render the manner in which it has been executed of no importance; no skill can render it beautiful, and no ability can give it worth.

The work before us is intended "for the use of the advanced student and general practitioner." It treats of minor gynecology, and the author states the "particular object" of the book to be "to supply the details of gynecological technique and practice." Not having the time and strength at his command to write a complete work on operative gynecology, he says: "I have chosen, for the present, several minor operations which are now agitating the professional mind more particularly, and which bid fair to become universally popular, leaving for a future time the preparation of a complete work."

In discussing such a design, the first thing that demands a passing glance is the present state of that department of the science of medicine called gynecology. This is essential; the existence of such a design *should* depend upon it. The first thing, and one of the most remarkable to be observed in this department of medicine, is the extreme divergence of the views held by authorities with regard to the pathology and treatment of the diseases of women; this divergence is not the least marked in those subjects of which the work before us treats.

Some years ago inflammation of the cervix of the uterus was supposed to be the great cause of female suffering: this supposition was acted upon, and a countless number of cervices were burnt off by means of caustics. This was the doctrine of the so-called "inflammatory school." Its first and chief exponent in England is still living. We shall make no further reference to this school. Then came the "mechanical school," whose great doctrine was that displacements, versions, and flexions of the uterus were the main factors in uterine pathology. This school threatened at one time to become universal; the simplicity and plausibility of its teaching, and the ease with which the morbid condition could be diagnosticated, paved the way for its general reception. Latterly, however, it has come upon troubled times, and has received injuries from which, although it manifests considerable vigor, it will not recover. Another school has risen within the last few years, and has rapidly gained adherents, more especially in America. This school places laceration of the cervix uteri in the position given to "inflammation of the cervix" and displacements by the inflammatory and mechanical schools respectively. The rapidity of the growth of this school in America reminds us of the growth of a certain gourd; whether it is destined to wither by like means is not yet manifest.

There is another school of gynecology which accepts none of the principal tenets of the above mentioned schools. Its adherents are not numerous among the special practitioners of gynecology, but they have never hesitated to maintain the correctness of their views. This school is sceptical or rational, and it holds no views or tenets which have not been established by anatomical, pathological, or clinical facts. It is not surprising then that the actual knowledge professed by its adherents should be small, their positive dogmas few, but their negations many. Its adherents are in the main the hard workers, who doubt and test the general and often sweeping assertions of the great authorities of the other schools to find them too often, alas, but inverted pyramids. The only good which has resulted from most of the speculations of the mechanical and laceratory schools has been to give occupation to diligent, scientific inquirers, who by careful study and research, carried on for years, have succeeded in establishing certain propositions on grounds

which are not to be shaken, while the mischief which has been done by them, especially by the mechanical school, is a part of the unknown.

Dr. Mundé's book is divided into three parts. The first treats fully of the manner of conducting an examination (verbal and physical) of a case, with a description of the instruments used in such examination. The second part treats of "minor gynecological manipulations and applications." In this part are described "catheterization," dilatation of the urethra, injections into the bladder, applications to the vagina, cervix, and endometrium, "tamponade of the vagina;" dilatation of the uterus by means of tents, bougies, dilators, knives, etc.; curetting of the uterus, reposition of the uterus and ovaries; pessaries and their introduction, etc.

The third part discusses gynecological operations, mainly, however, the operations for laceration of the cervix and of the perineum, and for prolapse of the uterus and the vagina.

The work is a mixed product, an emanation from two schools—the mechanical and laceratory. It is not tainted with any of the tenets or attributes of the sceptical school. On the contrary, it is characterized by implicit confidence and undoubting faith in the theories and the methods of treatment of the two schools mentioned—as undoubting indeed as if the author were entirely ignorant of the work which has been done during recent years—work which has set at rest the position of displacements in uterine pathology. No such work has as yet been done for the laceratory school, and until such work has been accomplished, the existence of that school must be an extremely uncertain one. The disciples of both these schools—the mechanical and laceratory—are faithful to their convictions whatever may be their attitude toward facts. The sum of the evidence in favor of the mechanical theory of uterine pathology consists of the following: convictions from clinical observation—whatever that may mean; the recognition of the association of displacements with suffering, and the non-recognition of absence of displacement with equal suffering, and of displacement with no suffering; the theory that flexion of the uterus causes stenosis of the canal, obstruction to the flow of the menses, and dilatation of the cavity of the body of the uterus; the inference that flexion causes pressure on the tissues of the uterus, and prevents the return of blood from the organ, and therefore gives rise to congestion and enlargement of its body; the theory that dysmenorrhœa is due to obstruction, and that that obstruction is due to stenosis of the inner or outer orifice or to flexion.

Now it is an astonishing fact, that in support of all or any of these theories, no evidence amounting to anything like proof has ever been produced; while, on the other hand, several of them have been proved to be absolutely false. Conviction alone from whatever experience, has no place in science, unless the process by which the conviction is arrived at is given. The association of suffering with displacements of the uterus is recognized by all schools, but this is no proof or even evidence in itself of a causal relation between them. The fact that no causal relation exists between displacement and suffering has, however, been established beyond doubt. Vedeler and Herman have shown that suffering is just as frequent in the absence as in the presence of flexion, and further, that flexion is present as often without as with suffering.

No evidence, whatever, is forthcoming in favor of the statement that flexion of the uterus causes stenosis of the canal; while every flexed uterus examined post-mortem has demonstrated the contrary, and, with

equal relentlessness shown that flexion does not give rise to dilatation of the canal above the angle of flexion; and Williams has shown that the circulation in the uterus is such that it is not possible for flexion of the organ to interfere with it. Thus by years of scientific labor and research it has been abundantly demonstrated that not one of the pathological convictions to which the mechanicians are so faithful has any basis in fact; and that all these convictions are the emanations of a too fervid fancy unfettered by a rigid regard for facts.

But let us proceed to another tenet of the mechanical school, which has called into existence much of so-called minor gynecology. Marion Sims started with the theory that dysmenorrhœa could not exist without stenosis of the uterine canal. This he treated as an axiom—a self-evident truth. Not finding the condition generally at the external os, he inferred it must be at the internal, acted accordingly, and invented a knife for division of the uterine wall at that part.

But what are the facts? Is not stenosis of the uterine canal at the inner or the outer orifice extremely rare, while dysmenorrhœa is extremely common? It is well known that if a Simpson's sound can pass along the uterine canal there can be no stenosis. It is also true that there are many cases in which it is difficult to cause the sound to enter the os internum; but this is due, not to stenosis of that part, but to imperfect manipulation, for once the sound has entered the cavity of the body, there is no difficulty in withdrawing it, the instrument is not grasped in the supposed narrow os. The same is true with regard to the os externum. Cases of conical cervix with small round external os are not uncommon, but it is extremely rare that such an os is so small as not to permit the entrance of a Simpson's sound. Pinhole os is a misnomer for this condition, and is infinitely rare. If the os be large enough to admit the sound, it is surely large enough to permit the flow of the menses and the entrance of the microscopic spermatozoa, for they readily penetrate the smaller lumen of the Fallopian tube. The theory that such conditions cause dysmenorrhœa or entail sterility would be too absurd for refutation, but for the fact that great names have endorsed it. There is no statistical evidence, but only general assertion, in favor of it, while every gynecologist has had evidence of its incorrectness in the fact that women with so-called "pinhole os" and conical cervix menstruate without pain and become mothers. The evidence at present before us shows that the mechanical system of uterine pathology has no claim to be regarded as a part of scientific medicine. The space at our disposal does not permit us to do more than point out the fallacies of this school, and we must, consequently, omit to point out the trouble and injury it entails upon women.

We come now to the third part. This treats of laceration of the cervix, of the perineum, etc. It differs from the second in the following respect: It not only describes the operations proposed and performed for these conditions, but it also discusses more or less fully the lesions themselves, their causes, symptoms, effects, etc. We find it stated that laceration of the cervix is a "prime factor" in the production of uterine disease, and that the operation for its cure "has become almost fashionable," and that "the significance of cervical laceration as a factor of uterine disease is now universally accepted by advanced gynecologists all over the world." We find, however, that "advanced gynecologists

all over the world," consist of some Americans, a writer of a thesis in France, and a few gynecologists in Germany, and one or two in England.

The evil effects of laceration of the cervix are summed up as follows: Subinvolution of the uterus, cervical and corporeal endometritis, papillary and cystic hyperplasia of the cervix, uterine fungosities, uterine displacements, chronic periuterine cellulitis and peritonitis, neuralgia of cervix, chronic ovaritis, and epithelioma, and two other conditions, namely, "the incapacity for conception, or absolute sterility, and its converse, the tendency to abortion or virtual sterility."

Laceration of the cervix, it is true, may be present with any of these conditions, but this is no proof that it is the cause of them. Every one of the above assertions is made without the semblance of proof. Every one of the above conditions, with the exception of the first and last, may be present in the virgin or nulliparous woman, and each of them may be the result of other causes than tears of the neck of the womb. Moreover, in ascribing them to tears of the cervix brought about during labor, all the profound and complex effects of pregnancy and labor, with the exception of the mechanical tear, are ignored—effects to which full weight must be given before a true pathology of the conditions in question can be arrived at.

The assertions above referred to, based on the flimsiest evidence, are to be greatly deprecated, for they are calculated to retard the progress of scientific gynecology, and will demand years of labor to give them their proper value, just as the assertions of the mechanical school have required years of work to establish their specious character.

The book places in the hands of the student and practitioner weapons which may be, and daily are productive of the gravest injury without giving the knowledge when to use them. The great difficulty is not *how* to operate but *when*, and a work such as the one before us is calculated not to inculcate good and sound practice, but to encourage meddlesome treatment and unnecessary operations. Illustrations of this statement abound in its pages, but let the following suffice:

> "By the persistent application to the vaginal roof and cervix once or twice a week for several months, of these agents, chiefly the pure tincture of iodine, I have seen most decided diminution in the size of the hyperplastic uterus, with marked amelioration of the various distressing hystero-neuroses so characteristic of this affection, and gradual softening and absorption of the exudation in not too old cases of pelvic peritonitis and cellulitis."

The course of these disorders is tolerably well known, and the practice here inculcated is on a par with the practice of introducing a pessary and paying a visit to it on alternate days—both are as unnecessary as they are mischievous and degrading.

The design of the book is bad; it shows an entire want of appreciation of the needs of the student and practitioner in gynecology. Under these circumstances we do not deem it necessary to notice the manner in which the design has been carried out.

TRANSACTIONS OF THE AMERICAN OTOLOGICAL SOCIETY. Eighteenth Annual Meeting. 8vo. pp. 520. New Bedford, Mass.

Dr. Charles H. Burnett, of Philadelphia, reports his experience in *The local use of cocaine and brucine in diseases of the ear.* He has not found much benefit from cocaine when there was violent inflammatory pain, or been able to produce sufficient local anæsthesia in the auditory canal by its use, to permit painless incision of the skin. A limited experience with brucine has been more satisfactory, and Dr. Burnett thinks it will be found particularly useful as an application to the skin of the meatus.

Dr. E. Eugene Holt, of Portland, Me., in answer to the question *Does cocaine hydrochlorate, while relieving the pain in acute otitis media, prolong the congestion?* states his belief that "while it relieves the pain when used early and repeatedly, it, at the same time, holds the inflammation, as it were, in check, which, when the effects of the drug subside, goes on in a more or less passive state, now and then lighting up anew, with twinging pains, keeping the mucous membrane in a congested, swollen condition." The general impression of the Society seemed to be that the effect of cocaine is superficial, and the relief of pain by its use only partial and temporary.

Dr. H. Knapp, of New York, in some remarks *On the desirability of adopting a uniform method of expressing the results of testing the acuteness of hearing*, maintains that Politzer's hammer has no advantage, as an acuometer, over the watch, which, with the voice, gives a sufficient test in a great majority of cases. He proposes to denote the different degrees of hardness of hearing, as tested by the watch and voice, by Dr. Prout's method of expressing them as fractions of the normal standard, as oculists express degrees of impairment of sight, and suggests the adoption of a uniform system of symbols to be used in recording.

Dr. Samuel Sexton, of New York, reports *Two cases of neglected ear disease in infants resulting in death.* The patients, in both cases, were about seven months old. There was no post-mortem examination in the first case, but the symptoms pointed to meningitis. In the second case, post-mortem examination showed purulent meningitis, with extensive disease of the temporal bone. The inflammation seemed to have extended from the tympanum underneath the auditory plate into the antrum, and a sinus afforded communication between the antrum and an abscess beneath the periosteum. The author calls attention to the fact that in young children the danger does not lie in an invasion of the mastoid, which is in a rudimentary state, but in an extension of the inflammatory process to the antrum.

Dr. O. D. Pomeroy, of New York, reports *A fatal case of suppurative otitis media, with abscess of the cerebellum, necrosis and caries of the petrous portion and hyperostosis of the roof of the tympanum.* The patient was thirty-eight years of age, and the ear had been suppurating since early childhood. The increase and extension of the inflammation were probably due to an injury to the side of the head.

Dr. Samuel Sexton, of New York, contributes a paper on *Inflammation of the attic of the tympanum*, which he thinks has not received the attention that its importance demands. He believes that this affection

frequently arises independently of the antrum, and that the membrana tympani may not be greatly, or at all, affected. "Chronic inflammation of the attic presents itself frequently in the form of a deep sinus, containing sometimes either pultaceous matter or inspissated pus, sometimes polypoid tissue or epithelial crusts, leading through the membrana flaccida, or inner extremity of the external auditory canal up into the attic, and frequently from that point into the antrum." Sometimes the membrana flaccida and ossicula are absent, while in other cases they remain, and, by thickening of the tissues, obstruct drainage of the discharge from the attic. These chronic processes may last for years, or even through a long lifetime. Acute inflammation may extend from the antrum to the attic, or both may be affected simultaneously, but the author believes that the attic is often involved alone. He considers inflammation of the attic more serious than that of the antrum, because swelling of the mucous membrane may close the outlets of the discharge, and there is special danger of extension of the disease to the cranial cavity. When pent-up discharge cannot be evacuated by puncture of the membrana flaccida, it is recommended to perforate the posterior wall of the external auditory canal.

In a paper on *The relation between chronic otitis media catarrhalis and chronic rhinitis*, Dr. Chas. H. Burnett, of Philadelphia, claims that non-suppurative chronic catarrh of the middle ear is invariably associated with some form of chronic rhinitis, usually the hypertrophic form; he considers this complication much more important than pharyngeal affections as a causative element in the aural disease, and maintains that local treatment should be directed chiefly to the nares.

Dr. W. W. Seely, of Cincinnati, advocates the application of yellow oxide of mercury in vaseline to the nasopharyngeal spaces in *The treatment of chronic otitis media.*

Dr. Chas. J. Kipp, of Newark, N. J., reports a *Case of fatal ear disease beginning as a circumscribed inflammation in the outer half of the external auditory canal.* The tympanum was never seriously involved at any stage of the disease. Post-mortem examination showed extensive purulent meningitis, and a small abscess in the cerebellum on the side of the affected ear. The mastoid cells were filled with pus.

Dr. E. Eugene Holt, of Portland, Me., reports *The present condition of the patient from whom teratoid tumors of both auricles were removed in 1883, and reported to this Society the same year.* For nearly a year there was but little indication of recurrence. At the end of that time the edges of the auricles commenced to thicken and there are now well-formed tumors.

Dr. D. B. St. John Roosa, of New York, proposes the term *Presbykousis* for the impairment of hearing in old age, due to senile changes without disease. He maintains that this condition can readily be distinguished from the deafness resulting from chronic proliferating processes in the tympanum and Eustachian tube. The subjects of presbykousis hear the tuning-fork better through the air than by conduction through the bone, which is not usually the case when there are pathological changes in the middle ear. The human voice is heard relatively much better than the tick of a watch, and hearing for conversation may be almost perfect in a quiet place, though much disturbed by surrounding noises. Dr. Roosa thinks that this form of impairment of hearing is due chiefly to a lessening of the perceptive power of the acoustic nerve,

though there are probably other causes, as senile rigidity of all the tympanic structures.

A case of acute otitis media suppurativa, followed by mastoid disease and pyæmia; mastoid operation; recovery, is reported by Dr. Graham Bacon, of New York. The attack commenced with earache, followed in three days with discharge, which continued profuse. Three weeks afterward there were tenderness and redness over the mastoid, and a Wild's incision was made, with temporary relief. A few days later there were nausea, vertigo, and chill. The mastoid process was opened with drills, and two drachms of pus were evacuated. Two weeks afterward there was cough with mucopurulent expectoration, preceded by chill. A few days later there were repeated chills, and abscesses formed near the ankle-joint, in the thigh, in the leg, on the arm, and in the neck. The patient eventually completely regained his health. The author believes that in many cases of this kind the aural disease is periosteal from the beginning.

Dr. E. Dyer, of Newport, R. I., reports a case of *Fistula auris.* A fistulous opening had existed in the tragus of a girl, fourteen years of age, since birth. There was frequently an offensive discharge from the opening. The sac was destroyed by galvanic cautery.

Dr. Samuel Sexton, of New York, describes a *Binaural conversation tube for the instruction of the deaf.* An additional mouth-piece is attached to enable the person using it to hear his own voice.

Professor A. Graham Bell, of Washington, D. C., in some remarks *On the possibility of educating the hearing of deaf-mutes,* calls attention to the fact that a large proportion of the so-called deaf-mutes in our institutions are only hard of hearing; this proportion being especially large among the congenitally deaf. It has been found that children born with partial hearing, but not enough to enable them to acquire speech by imitation, can, by means of artificial aids to hearing, be taught to speak, and, when so taught, are only hard of hearing. In the Nebraska Institution for Deaf-mutes, fifteen per cent. of the pupils are graduated as hard-of-hearing speaking people, and not as deaf-mutes, and the Principal thinks that twenty-five per cent. have sufficient hearing to be made useful.

A very full and carefully prepared *Alphabetical index of otological literature, from July, 1884, to July, 1885,* compiled by Dr. Graham Bacon, of New York, and Dr. Francis H. Brown, of Boston, closes the volume.

G. C. H.

TEXT-BOOK OF OPHTHALMOSCOPY. By EDWARD G. LORING, M.D. PART I. THE NORMAL EYE, DETERMINATION OF REFRACTION, DISEASES OF THE MEDIA, PHYSIOLOGICAL OPTICS, AND THEORY OF THE OPHTHALMOSCOPE. 8vo. pp. iv., 274. New York: D. Appleton & Co. London: Cassell & Co., Limited, 1886.

THE connection of its author's name with a most popular and excellent form of refraction ophthalmoscope adds to the interest felt in this long-promised work; which seems, on the whole, to be the best exposition of its subject that has so far appeared in medical literature.

Disregarding the traditional forms of bookmakers, Dr. Loring enters directly upon the consideration of his subject, without dedication, preface, or formal introduction. Omitting the customary "reasons which led the author to prepare," etc.; his work is left to stand on the general *raison d'être* for any new medical book, viz., that it presents the facts dealt with more briefly, clearly, correctly, or completely than previous treatises.

This book shows the effect of deliberate preparation. A general characteristic is the thorough incorporation of its matter in one harmonious whole. It is no literary patchwork, but a carefully woven fabric of fairly uniform excellence. It contains but few needless repetitions; no sudden interruptions of the train of thought; no accumulations of contradictory and confusing statements beneath which an author's real belief, or absence of belief, is so often buried. For instance of the latter: after giving the various theories to account for the light-streak on the retinal vessels, propounded by Van Trigt, Jäger, Schneller, and himself, the author sets forth clearly the real state of our knowledge by this judicial summing up: "It will be seen then, from these various opinions, that no thoroughly satisfactory and acceptable explanation of the presence of the light-streak on the centre of the retinal vessels has as yet been given."

The book opens with general remarks and descriptions of methods. Then follows a chapter on the anatomy of the fundus, in so far as it determines ophthalmoscopic appearances. Then these appearances in the normal eye are described. Chapter V., on "The Determination of the Optical Condition of the Eye with the Ophthalmoscope," has been before the profession some ten years in the form of "advanced sheets." Among the slight additions that have been made to it, is a table for calculating the shortening or extension of the optic axis in H. or M.; and in the explanation of this table we note this error. "In a second case the border of the nerve and general fundus is myopic 1.5 D., the bottom of the excavation is myopic 4 D., the true extent of the excavation will be 4 D.—1.5 D. = 2.5 D.; M. 2.5 D. = 0.76 mm." Of course, to get the real difference between the two planes both should be first referred to the plane of emmetropia, and the difference of their values in millimetres obtained thus: M. 4 D. = 1.28 mm., M. 1.5 D. = 0.45 mm.; 1.28 mm.—0.45 mm. = 0 83 mm., the real depth of the excavation. The last chapter deals with the examination of the normal and abnormal media. It gives a good account of the results obtained by "oblique illumination," illustrating how these must supplement and interpret ophthalmoscopic appearances.

Finally, an appendix of over sixty pages sets forth the optical principles involved, and the theory of the ophthalmoscope. To this the beginner should first turn, for broadened and made easy as it may be, a clear understanding of these principles remains the only true door to the ophthalmic fold.

It is usually unfair to criticise a book for its omissions; and this might be specially urged for one, of which only the first part is before us, without even a schedule to show what may be expected of other parts. Still, attention must be called to the utter ignoring of retinoscopy as a practical method for the measurement of refraction. Reference is made to Bowman's classical note (Donders, 1864) and Couper's proposed method

(*Trans. Fourth International Congress*, 1872), and then the subject is thus dismissed:

"Since Mr. Bowman's article (*sic*) others have taken the matter up and produced many and voluminous essays upon the subject of determination of refraction with the mirror alone, under the titles of "Keratoscopy," "Pupiloscopy," and "Retinoscopy." It still means, however, in my opinion, the most difficult and least satisfactory of any of the methods of determining the refraction of the eye, and contributes nothing which cannot be more easily and more expeditiously performed by the upright image. I would refer the curious, however, and those fond of optical problems for their own sake, to papers on the subject by," etc.

This is much as though, in a systematic treatise on operative surgery, we should read of general anæsthesia: "The ancients were accustomed to administer large doses of narcotics to those about to undergo severe surgical operations; and about the beginning of this century Sir Humphry Davy made some remarkable observations with reference to the effects of nitrous oxide. Since that time a good deal has been written on the subject under the titles of Etherization, Chloroformization, and Anæsthesia, for which the curious are referred to." etc. The suppositious case only seems more absurd, because all are familiar with anæsthesia, while, as regards retinoscopy, many ophthalmologists in this country have not yet mastered it; and in their ignorance of its advantages would doubtless echo Dr. Loring's opinion. But the procedure, especially with the plane mirror, has demonstrated its claim to the attention of every one who undertakes to diagnosticate accurately errors, of refraction, and ere long that claim will be universally admitted.

Another matter for regret is, that our author should only mention the forms of ophthalmoscope he has himself devised. "Not," he explains, "because they are in any way better than others, but simply because he is better acquainted with their qualities good and bad." Still, it is to be presumed that he is much better acquainted with the qualities, good and bad, of the "thousand varieties, by as many inventors," of this important instrument than most of his readers can be; and some comment upon the more popular and valuable forms was not too much to expect from a work of this character. At least some general discussion of focal lengths for concave mirrors, size of aperture, series and succession of lenses, would have been valuable; if it only served to narrow the limits of useless invention and modification.

The paper, printing, and proof-reading are excellent. The book is well illustrated with woodcuts and diagrams. It has also a few colored plates which compare favorably with anything of the kind we have heretofore seen, but which still forcibly remind us that while the forms of the fundus may be accurately shown, the exact reproduction of its myriad hues and shades of color still baffles the printer's skill. As a whole, the book is well written, comparatively free from awkward or obscure expressions, and contains much of interest to the most advanced student (that is, the most experienced practitioner) of ophthalmoscopy, yet it can be readily followed by the tyro. It will be well worth its price to him who learns from it but the truth of this one sentence: "Five-sixths of the art of ophthalmoscopy are contained in a knowledge of the normal eye, the rest is a series of representations which can be read almost at sight."

E. J.

A TREATISE ON THE DISEASES OF INFANCY AND CHILDHOOD. By J. LEWIS SMITH, M.D., Clinical Professor of Diseases of Children in Bellevue Hospital Medical College, New York; Consulting Physician to the New York Infant Asylum, etc. Sixth edition, thoroughly revised. 8vo. pp. 867. With forty illustrations. Philadelphia: Lea Brothers & Co. London: H. K. Lewis, 1886.

RARELY does a pleasanter task fall to the lot of the bibliographer than to announce the appearance of a new edition of a medical classic like Prof. J. Lewis Smith's *Treatise on the Diseases of Infancy and Childhood.* For years it has stood high in the esteem and confidence of the profession, and with the additions and alterations now made it may be truthfully said to be the best book in any language upon the subject of which it treats.

An examination of the text fully sustains the claims made in the preface that, "in preparing the sixth edition, the author has revised the text to such an extent that a considerable part of the book may be considered new." The fact that such extensive revision was necessary in order to keep Dr. Smith's book abreast of current pediatric literature, is the best possible proof of the rapid advancement made during the past few years in this department of medicine. One new section has been added, in which the following diseases of the genito-urinary organs are discussed: Uric acid infarctions, enuresis, calculi, dysuria, cryptorchia, and vulvitis.

While nearly every page bears evidence of careful and intelligent revision, a considerable number of the chapters have been entirely rewritten; among the latter, we would call especial attention to the chapters on infant feeding, scarlet fever, pseudo-membranous croup, and infantile diarrhœa.

The article on scarlatina is an exhaustive monograph of sixty-eight pages, in which is discussed with minuteness every phase of the disease. It is, however, but fair to state that it is almost a literal reproduction of the article on scarlatina contributed by the author to "The System of Practical Medicine by American Authors."

In conclusion, if the young practitioner proposes to place in his library but one book on the diseases of children, we would unhesitatingly say, let that book be the one which is the subject of this notice.

W. J. C.

A COMPLETE PRONOUNCING MEDICAL DICTIONARY. By JOSEPH THOMAS, M.D., LL.D. Royal 8vo. pp. 844. Philadelphia: J. B. Lippincott Company. London: Cassell & Co., Limited, 1886.

THE aim of this handsomely printed volume is to furnish aid especially to those who are beginning the study of medicine and its allied sciences. Its author, therefore, has thought it necessary to devote much care to the etymology of words, as essential to a correct understanding of their exact meaning, and as an aid to the memory of the student. In

this we think he is right, and are sure that the majority both of lexicographers and ordinary readers will admit the correctness of his views.

Our author, also, has thought it wise to include literal translations of ordinary anatomical terms as parts of his definitions. This bringing a book down to the comprehension of the ignorant is not in accordance with our views, either upon literary or utilitarian grounds. But whether we are right in this opinion or not, there can be no question that such a course involves the author in much difficulty, by leading him to think that a mere translation is the equivalent of a definition. Thus we turn to the sample cited in the preface, *extensor digitorum communis*, and we are told that it is "the *common extensor of the fingers*. A muscle of the forearm, the tendons of which are inserted into the phalanges of all the fingers, which it extends." But certainly such a definition is of little use. Apart from the fact that an opportunity to convey etymological instruction is lost, by calling the digits fingers, in what purports to be a literal translation, the veriest tyro in anatomy must know that the muscle in question is in the forearm, and that as it is an extensor, it is quite likely to extend something. It would certainly be more to the purpose to give the precise origin, the peculiar insertions, and the exact location of the muscle. If we are to have anatomy taught in a dictionary, it should by all means be precise and helpful anatomy, rather than such superficial statements as the above. But Dr. Thomas has whetted our curiosity, and we look for the name of a little muscle which has been preserved in our memory by the rhythm and melody of its Latin name, the *levator labii superioris alæque nasi*. That little muscle, playing an important part in our times of joy and sadness, is certainly entitled to a place in a complete dictionary; but we look in vain, its treasured name does not appear. Certainly Dr. Thomas must have used that muscle many, very many times, unless he is the most impassive of lexicographers, and yet he passes it by unmentioned. Oh, Dr. Thomas! to undertake to tell beginners in anatomy the names of things and their meanings, and to consign to oblivion the name of that dear little muscle which so manfully bears its part in every emotion of their lives.

As would be expected from the author of what is specifically styled a pronouncing dictionary, Dr. Thomas has paid great attention to the pronunciation of words, and with true lexicographer's zeal he lays down the rules by which he has been governed in this matter. It would not be interesting to our readers to go into these rules in detail. For that we must refer them to the book itself, and to its well written and modest preface. Suffice it to say, that we see no reason to differ from our author either in his rules, or with his practical exposition of them in the body of the work, so for as we have examined.

Recognizing the vast importance of botany to the materia medica, very many botanical terms are included in this dictionary, and in this respect no one will be inclined to dispute its author's wisdom, or to question his assertion that the physician should seek to become acquainted with nature in the widest sense of the term, more especially with a department of science which bears so largely upon the healing art.

A notable feature in the volume is the insertion of an encyclopædic article ten pages long, on Pathogenesis, by Dr. Morris Longstreth. While we fail to see the propriety of putting such an article in such a book, the paper itself is worthy of high commendation. In it the older and more recent germ theories of disease are discussed with sufficient

fulness and much precision. The part borne by different investigators toward the elucidation of the germ theory is well told, and Dr. Longstreth's conclusions are wisely moderate. The subject is brought down to a late date, and is well summarized in a way which is not only suitable for beginners in the study of medicine, but in one which will convey information satisfactorily to many whose lives have been devoted to it. We well understand the desire of the author to secure so able and scholarly a paper for his book, but we do not see that, important as the topic confessedly is, that it is sufficiently so to warrant the occupation of so large a space with its discussion in a dictionary for beginners. We also confess to some surprise that Dr. Longstreth should have been willing to bury so excellent a paper in such a way.

It is, of course, easy to criticise the presence or absence of particular words in almost any dictionary, for in the most perfect there will be errors both of commission and omission. We do not, therefore, propose to submit Dr. Thomas's to an elaborate analysis of this kind, but will content ourselves with the narration of a special experience. As this review was being written, a beginner in medicine asked us the meaning of the term Cheyne-Stokes respiration. Distrusting our own powers of definition, we turned over the pages of the dictionary for an accurate explanation of the term, but we were unable to find it or any definition of it.

But we have said enough to make quite clear the estimate we are disposed to place upon this volume. Being written for beginners, it is in a measure exempt from the severe criticism to which it might otherwise be fairly subjected. We have only to say that even the beginner will very likely be disappointed as he seeks for information in its pages upon technical subjects, and that so soon as he ceases to be a beginner, that is after two or three weeks' study, he will do well to get another dictionary. S. A.

HEALTH REPORTS.

FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF NEW HAMPSHIRE, FOR THE YEAR ENDING APRIL 30, 1885. Pp. 317. Concord: 1885.

SEVENTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF RHODE ISLAND, FOR 1885. Including Report on Births, Marriages, and Deaths in 1883. Pamphlet, pp. 409. Providence: 1885.

THIRD BIENNIAL REPORT OF THE STATE BOARD OF HEALTH OF IOWA, FOR THE FISCAL YEAR ENDING JUNE 30, 1885. Pp. 584. Des Moines: 1885.

FROM the general report of NEW HAMPSHIRE, it appears that the State has not been visited by any epidemic during the past year, although the usual apprehension was felt in regard to the advent of cholera, happily as yet proved to be needless. The numerous reports from towns indicate a moderate prevalence of typhoid fever and diphtheria, and in many instances the origin or increased virulence of these filth diseases was duly traced to contamination of the water supply, particularly by sewage. Smallpox is not mentioned among the twenty prominent causes

of death, so that no epidemic of variola has occurred, a favorable record which we hope that rigid quarantine and careful vaccination will enable the sanitary authorities to duplicate next year, notwithstanding the threatened invasion of this loathsome malady from the plague-stricken Canadian provinces.

Beside an excellent digest of the proceedings at the last meeting of the American Public Health Association, Dr. G. P. Conn, of Concord, President of the Board, contributes a valuable essay upon the "Milk Supply of Large Towns and Cities," in which the vital importance of due attention to the health of cows is insisted on. Dr. William Child, of New Hampton, endeavors, in an article upon "Country-homes—their Sanitary Condition," to popularize the important truth, that contaminated drinking water may not only disseminate the germs of cholera and typhoid fever, but tends to reduce the vitality, and impair the physical and mental qualities of those employing it as a beverage. A well-written paper, condensed from the thesis presented by W. E. Angier, of West Swanzey, gives "Some of the Practical Results of Sanitary Engineering," and the instructive dissertations of Prof. R. C. Kedzie, of Michigan, on "Drainage for Health," and of Prof. T. W. Chittenden, of Wisconsin, upon "Nostrums," are reprinted in the latter part of this highly creditable volume.

A large portion of the RHODE ISLAND report is made up of statistical tables in regard to births, marriages, divorces, and deaths throughout the State. No epidemic of diphtheria has occurred in any of the towns, but malarial diseases have been decidedly more prevalent, and sundry sections were invaded for the first time in 1884. Several epidemics of measles in a mild form, and scarlatina of a severe type, are noted, also a few outbreaks of whooping cough have occurred. From typhoid fever an unusual immunity is recorded.

Among the occasional papers, we find reprints of various instructive circulars prepared by the industrious Secretary, Dr. Chas. H. Fisher, chiefly in regard to cholera, and calculated to distribute the requisite information for forearming local sanitary authorities against this dreaded scourge of humanity. Statements in regard to the operations of the cattle commission apprize us that inoculation for hog cholera, which prevailed to a considerable extent, has been practised with alleged advantage in reducing the rate of mortality. Glanders has been detected in twenty horses, among more than two hundred animals inspected. Numerous inspections of cows supposed to be affording a dangerous milk in consequence of their being affected with pulmonary consumption, have been made, and caution is earnestly advised against the danger of introducing contagious pleuro-pneumonia from Western cattle, which are now known to be tainted in many instances with this fatal malady. The most important essay is an elaborate report by Samuel M. Gray, C. E., of Providence, on "Sewage Systems and Sewage Disposal," which is profusely illustrated by twenty-three plates, depicting the various forms of apparatus described. Mr. Gray asserts that whilst the separate system of sewerage (such as that introduced by Mr. Waring into Memphis, Tennessee) possesses great merit, and is particularly valuable in the development of small towns, it is not admitted that the combined system deserves all the censure that has been heaped upon it, nor that the separate system is intrinsically the best in all cases, as has been claimed. "Each system

has its defects as well as its merits, and the choice will depend upon local conditions. The two systems may be used in some cases in different parts of the same city with better results than would be obtained from the exclusive use of either."

From the IOWA report we learn that a gratifying improvement in the influential position of the Health Board has occurred during the past few years, so much so that the community accept and adopt to-day any regulation of the board, which five years ago would have been received with indifference if not with contempt. A large part of the volume is taken up with statistical tables, records of proceedings, and abstracts of reports, from local sanitary authorities prepared by the indefatigable secretary and assistant. Among the interesting papers which compose the remainder of the book our limited space only permits us to notice the following timely article upon "Overpressure in Schools," by Dr. W. S. Robertson, President of the State Board of Health, in which the folly of the forcing system, too common in our educational institutions, is eloquently insisted upon. An elaborate essay on the "Lighting and Seating of Schoolhouses" from the pen of L. F. Andrews, Acting Secretary of the Board, is illustrated by numerous engravings, and a reprint of Snellen's test-types for use in testing the acuity of vision. His thirteen rules for teachers, would if obeyed, largely aid in removing the defects now so manifest in a large majority of the public schools. A short paper by H. H. Clark, member of the Health Board, on the "Communication of Contagious Diseases by Second-hand School-books," expresses the opinion that danger from such a source is exceedingly small, as letters of inquiry answered by two hundred and fifty physicians in various parts of the United States, failed to elicit the history of a single event of this kind. Dr. J. M. Hull, in an interesting article upon "The Opium Habit," declares that from reliable information he feels safe in saying that there are in Iowa over ten thousand people constantly under the influence of an opiate, and urgently advocates some means for checking the rapid spread of this evil. Such restrictive measures, he thinks, may be found to some extent in legislative enactments regulating the sale of opium and its preparations, but the great means for acomplishing this desirable object is undoubtedly popular instruction in regard to the danger of prolonged use of opiates, especially by hypodermatic injection. J. G. R.

A TEXT-BOOK ON MEDICAL PHYSICS, FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By JOHN C. DRAPER, M.D., LL.D., Professor of Chemistry and Physics in the Medical Department of the University of New York, and of Natural History and Physiology in the College of the City of New York, etc. With 377 illustrations. 8vo. pp. 733. Philadelphia: Lea Brothers & Co. London: J. & A. Churchill, 1885.

AMONG the books that medical students of a former generation were advised to read was Arnott's *Elements of Physics, General and Medical.* It is long since out of print, but there are still living many who re-

member with pleasure its clear and untechnical explanations of physical phenomena. For this generation there is no American publication to take its place, unless that position be accorded the new work by Dr. Draper.

The subject-matter of this book is very different from that of Arnott; indeed, some of its most important facts were unknown even at the latest date of the latter publication. Some observations concerning the physiological effect of variations of atmospheric pressure had been recorded, but the epoch-making researches of Paul Bert and his co-workers are of recent date, and real knowledge of that subject begins with the publication of his treatise on *Barometric Pressures*. In his abstract of Bert's work, Dr. Draper presents at some length the method of study and also the conclusion, namely, that all the effects known as *mal des montagnes* experienced at and above an altitude of 10,000 feet, can be produced at the sea level without change of pressure, by reduction of the percentage of oxygen in the air respired.

The fruitful inquiries of Junod and Pravaz, upon the therapeutic influence of compressed air, are adequately set forth. Compressed air was shown by them to have much the same effect as one too rich in oxygen. There is a poison line for oxygen as well as for pressure of the inspired air. As a corollary to these facts, it is suggested that in building bridge piers in caissons, at depths giving more than five atmospheres of pressure, grave consequences may be averted by employing an atmosphere containing a smaller per cent. of oxygen than normal air. The later advances in acoustics and optics have had intimate relations to medicine, and make some acquaintance with these sciences necessary to the properly equipped physician. The specialist will still need his Helmholtz, but the general medical reader will find in Draper as good an epitome of the phenomena of sound and light as he cares for.

The microscope is there dealt with as an instrument of research. Carpenter is borrowed from liberally in this connection. The bacteria do not escape notice; they are pictured, cilia and all.

The latest methods of germ-culture are referred to, though it can scarcely be said that they are described with the minuteness requisite for exact studies in this highly technical field.

There is a good summary of electrotherapy at the close, for which due credit is given to Bartholow, Morgan, and Robertson. The book makes such interesting reading to a doctor, that one is loath to say that part of it has no medical bearing whatever. To be sure, the principles of a science lie at the root of its applications and must be taught if teaching be thorough. Much of every technical work must be devoted to general truths; still, the medical reader would not have missed the delightful chapter on Ultra-Gaseous Matter, had it been omitted along with various paragraphs alluding to non-medical applications, such as the Morse telegraph. If these are retained in the second edition, Arnott's title, "Physics, General and Medical," would better indicate the nature of the contents.

J. W. H.

A Manual of Operative Surgery. By Lewis A. Stimson, B.A., M.D., Surgeon to the Presbyterian and Bellevue Hospitals, etc. Second edition, with 342 illustrations. 8vo. pp. xxiv. 506. Philadelphia: Lea Brothers & Co. London: H. K. Lewis, 1885.

Practical Surgery: Including Surgical Dressings, Bandaging, Fractures, Dislocations, Ligature of Arteries, Amputations, and Excisions of Bones and Joints. By J. Ewing Mears, M.D., Lecturer on Practical Surgery and Demonstrator of Surgery in the Jefferson Medical College, etc. With 490 illustrations. 8vo. pp. xii. 794. Philadelphia: P. Blakiston, Son & Co. London: Cassel & Co., Limited, 1885.

It is a pleasure to call attention to two such admirable books from the pens of American surgeons as we have here. Both authors are men of experience in the practice and in the teaching of surgery, and both of them have presented such manuals as this fact would lead one to expect. They are full of good common sense and may be safely taken as guides in the matters of which they treat. The very numerous illustrations add much to the value of these books. Those in the book of Dr. Mears include a large number representing surgical appliances and apparatuses, as might be expected from the fact that more than half of it is occupied with the discussion of dressings, bandaging, fractures, and dislocations. Dr. Stimson's book, on the other hand, contains the larger number of illustrations of defects and injuries, and of the operations for their relief.

It would be hard to point out all the excellences of these two books, and it is not easy to find defects in them. But we note with some surprise that Dr. Mears has not given any account of the way in which to perform an operation in regard to which he has eminently the right to speak, viz., partial excision of the upper jaw for ankylosis; and that Dr. Stimson has not described the best *technique* of the operation of suprapubic lithotomy.

In conclusion, we can heartily recommend these books to students, and to practitioners of surgery, who will find in each an amount of attention given to the details of operative methods which cannot be expected, and which certainly cannot be found, in the larger works on general surgery.

C. W. D.

QUARTERLY SUMMARY

OF THE

PROGRESS OF MEDICAL SCIENCE.

ANATOMY.

UNDER THE CHARGE OF

GEORGE D. THANE, M.R.C.S. ENG.,

PROFESSOR OF ANATOMY AT UNIVERSITY COLLEGE, LONDON.

THE MORPHOLOGY OF THE SKELETON OF THE HAND AND FOOT.

In earlier communications to the Philosophical Society of Jena PROF. K. BARDELEBEN announced his discovery of a hitherto unrecognized bone, which he termed *os trigonum*, in the tarsus of many marsupials. A cartilaginous rudiment of this bone is present in the early human embryo, and usually becomes fused with the astragalus, the posterior process of which it forms, but it occasionally ossifies independently and gives rise to a supernumerary tarsal ossicle. In the *Jenaische Sitzungsberichte* for 1885, he publishes the results of further researches into the constitution of the skeleton of the mammalian manus and pes, of which the following is a brief summary: In the human fœtus from the sixth to the eighth week the cartilaginous navicular of the tarsus is divided into two parts, inner and outer, a condition that recalls the double navicular bone of rodents. The tuberosity of this bone is also ossified from a separate centre appearing at the time of puberty. In the manus of some insectivora Bardeleben has found another ossicle which he names *triangulare carpi*, and in cryptoprocta a corresponding *triangulare tarsi*, the element thus represented being a second centrale. Indications of the triangulare are also present in man, in whom it becomes incorporated in the magnum and external cuneiform respectively. Traces of an original division are to be recognized in the semilunar, pyramidal, unciform, trapezium, astragalus, calcaneus, cuboid, and internal cuneiform. The styloid process of the ulna and the internal malleolus of the tibia are represented in the fœtus by detached portions of cartilage.

The author has also collected a mass of evidence in support of the earlier existence of a sixth digit on the preaxial side of the pollex and hallux. Vestiges of this *prepollex* and *prehallux* occur in the form of accessory ossicles in many animals, and supernumerary digits in this position in man are re-

garded as theromorphic varieties dependent upon atavism. There exist also less pronounced indications of a seventh, postaxial digit.

In consequence of these researches Bardeleben believes that the typical carpus or tarsus must be regarded as consisting of fifteen or seventeen factors, arranged in a proximal and a distal row of six or seven elements each, being one for each original digit, and an intermediate row of three centralia. He is inclined to derive the digitate appendage from a series of parallel rather than diverging rays.

The Sacral Index in Various Races of Mankind.

Prof. W. Turner discusses the form of the sacrum in different races of men, and uses the terms *dolichohieric* to signify a sacrum longer than broad (index below 100), and *platyhieric* for a sacrum in which the breadth exceeds the length (index above 100). From measurements of male specimens made by himself and those recorded by previous observers, he has drawn up the following provisional table:

Dolichohieric.	Platyhieric.
Australians.	Europeans.
Bushmen.	Negroes.
Hottentots.	Melanesians.
Kaffirs.	Polynesians.
Andamanese.	Hindoos.
Tasmanians.	Guanche?
Chinese?	Esquimaux?
Ainо?	North American Indians.
Malays.	South American Indians.

A dolichopellic brim is generally associated with a dolichohieric sacrum, a platypellic brim with a platyhieric sacrum. In the anthropoid apes the sacrum is markedly dolichohieric, the index in the orang being eighty-seven, in the chimpanzee seventy-seven, and in the gorilla, seventy-two.[1]—*Journ. of Anat. and Physiol.*, January, 1886.

The Muscles of the Orbit and the Capsule of Tenon.

C. B. Lockwood describes, in addition to the tendon of Zinn, a similar common tendon of origin for the superior and the upper portions of the internal and external recti, arising from the upper and outer part of the margin of the optic foramen, and placed on the ocular aspect of the muscles. He has also studied, principally by means of frozen sections, the anatomy of the capsule of Tenon, especially in its relation to the ocular muscles. The *external* and *internal check ligaments* are wedge-shaped in horizontal section, and consist mainly of elastic tissue; but they receive also some of the superficial muscular fibres of the corresponding recti. The base of the wedge is turned forward, and is attached by its ends to the suspensory ligament of the eye and the malar bone or lachrymal crest respectively. A distinct fascial sheath surrounds the forepart of the levator palpebræ, and becomes blended on its under surface with the sheath of the superior rectus derived from the

[1] In the report of Prof. Turner's paper on the index of the pelvic brim in the last number of this journal, the terms expressing the classification were, by a printer's error, wrongly given: they should be *platypellic*, *mesatipellic*, and *dolichopellic*.

capsule of Tenon. Into the angle of junction of the two sheaths fibres pass from the rectus, and that muscle is thus connected with the tendon of the levator and the upper eyelid. As the expanded tendon of the levator is attached on each side to the margin of the orbit, this apparatus acts also as a check ligament to the superior rectus. The lower portion of the sheath of the inferior rectus is divided into two layers, an upper, which is continuous with the suspensory ligament of the eye, and a lower, which joins the delicate sheath of the inferior oblique, while both are attached in front to the lower eyelid. The *suspensory ligament of the eye* is a boat-shaped thickening in the capsule of Tenon beneath the lower fourth of the circumference of the eye, and attached by its ends to the lachrymal and malar bones. The ocular muscles perforate the capsule of Tenon by well-defined openings opposite the equator of the eye, and the hinder margins of the apertures for the recti are formed by fibrous bands, called the *intracapsular ligaments*, to which the function is attributed of protecting the eye from pressure during the action of the muscles. The membranous capsule of Tenon is separated from the sclerotic by a layer of loose connective tissue, which is termed the *tunica adventitia*.—*Journal of Anatomy*, October, 1885.

The Venous Plexuses and Muscles of the Female Perineum.

According to the investigations of Tschaussow (*Archiv f. Anatomie*, November, 1885), the veins of the female genito-urinary organs form in the pelvis and perineum the following four plexuses:

1. The *urethro-vesical plexus* lies on the front and sides of the urethra and lower part of the bladder. Into it enter the dorsal vein of the clitoris, the right and left pudic veins (which unite in an arch between the urethra and symphysis pubis), short veins from the corpora cavernosa clitoridis, a communicating branch with the obturator vein, and slender branches from the wall of the urethra and neck of the bladder.

2. The *utero-vaginal plexus* surrounds the vagina and the neck and body of the uterus, forming on each side of those organs a dense convoluted mass, which is traversed by the lower end of the ureter. It receives tributaries from the uterus and vagina, the base of the bladder, the bulbs of the vestibule, and the front of the anus (*venæ hæmorrhoidales inferiores anteriores*). The efferent vessels of the urethro-vesical and utero-vaginal plexuses, *vesical*, *vaginal*, and *uterine veins*, pass outward and backward to the internal iliac veins.

3. The *utero-ovarian plexus* is formed by the veins of the fundus of the uterus, the Fallopian tube and the ovary, and empties into the ovarian vein.

4. The *perineal plexus* consists of two parts: the one, superficial, is formed by the veins of the labia majora and some of those from the preputium clitoridis and bulbs, passing to the superficial perineal vein, and has communications with the superficial epigastric and pudic and the external obturator veins; the other, deep, receives the veins of the corpus cavernosum clitoridis, veins from the bulb, and a considerable branch descending from the dorsal vein of the clitoris along the inferior ramus of the pubis, and terminates in the internal pudic trunk, which is joined by the superficial perineal and the

inferior hemorrhoidal veins as it runs backward to open into the internal iliac trunk.

The muscles of the forepart of the perineum form two strata, a superficial, including the bulbo-cavernosus, ischio-cavernosus, and transversus perinei superficialis, and a deep, comprising the transversus perinei profundus, sphincter vagino-urethralis, and sphincter urethræ.

The *bulbo-cavernosus* springs from the perineal septum and anterior extremity of the sphincter ani externus, and terminates in two layers which embrace the body of the clitoris, the right and left halves joining in the mesial plane. The muscle compresses the glands of Bartholin, the clitoris with its dorsal vein, and the veins issuing from the bulbs of the vestibule.

The *transversus perinei profundus* passes from the conjoined pubic and ischial rami to the perineal septum. In well-developed specimens a superficial layer of fibres is directed obliquely forward to the bulb. It is a tensor of the middle perineal fascia (triangular ligament).

The *sphincter vagino-urethralis* lies partly over the outer edge of the vestibule, and partly beneath its bulb, along the side of the vagina at the level of the hymen. The fibres terminate in front on the anterior aspect of the lower part of the urethra; behind, the lower ones reach the perineal septum, the upper ones end on the side of the vagina.

The *sphincter urethræ* (externus) is a layer of circular striped fibres surrounding the upper half of the urethra, and traversed in its posterior part by bundles of longitudinal fibres. Within this muscle is the sphincter urethræ internus, consisting of plain fibres.

The transversus vaginæ of Führer, the constrictor urethræ and transversus urethræ of Lesshaft do not exist.

The Cavernous Sinus.

Prof. K. von Langer gives (*Wiener Sitzungsberichte*, May, 1885) the results of an investigation of the cavernous sinus by means of sections and corrosion-preparations. In the child it is represented by a venous plexus in the dura mater, which, by enlargement and fusion of its channels, becomes the sinus with its characteristic cavernous structure. In old age the trabeculæ diminish and the cavity becomes simpler. The carotid artery, with the sixth nerve, lies against the outer wall of the sinus, and is separated from the body of the sphenoid by the blood-space. The basilar plexus (Virchow) shows similar variations with age, and the occipital sinuses are persistent channels of a plexus covering the lower part of the occipital squama in the fœtus. Langer has also found in children a plexus formed by branches of the ophthalmic veins resting against the orbital surface of the great wing of the sphenoid, and corresponding to a largely developed plexus in the orbit of ruminants.

The Origin of the Spinal Accessory Nerve.

The origin and central course of the spinal accessory nerve have been studied by L. Darkschewitsch in transverse and frontal sections of the medulla oblongata and upper part of the spinal cord in fœtuses of various ages. In the spinal cord the roots traverse the direct cerebellar tract, the crossed pyramidal tract, and the lateral portion of the anterior gray cornu, describing

a curve with its concavity turned forward and outward. In the anterior horn the fibres join the outer group of nerve cells which is regarded as the special nucleus of the spinal accessory nerve. A distinct external group of cells is found as far down as the lowest part of the fifth cervical nerve, coinciding with the extent downward of fibres of origin of the spinal accessory nerve. In the medulla oblongata the fibres of the accessory portion of the nerve pursue a similar but more sharply curved course, and join a collection of cells continued upward from the spinal nucleus, and situated on the dorsal side of and external to the hypoglossal nucleus. Its upper limit is about on a level with the union of the middle and lower thirds of the olivary body. The roots of the accessory portion are also joined by fibres from the funiculus cuneatus and its nucleus. From the origin of both spinal and accessory portions from one continuous nucleus, from the similar course of the fibres of origin within the nervous centre, and from the large size of the fibres composing both portions, it is concluded that the generally accepted view is correct, according to which the two are regarded as parts of one nerve.—*Arch. f. Anatomie,* November, 1885.

The Bloodvessels of the Salivary Glands.

Prof. N. Kowalewsky, of Kasan (*Archiv f. Anatomie,* November, 1885), finds, by adopting a system of incomplete injection, that in the submaxillary gland of the cat there exist two systems of vessels which differ in the resistance they offer to the blood-stream; one system, of lesser resistance, with capillaries in the walls of the ducts, and another system, of greater resistance, having its capillaries in the lymph spaces between the alveoli. He infers from this that in the resting condition of the gland the blood flows mainly through the capillary network of the ducts, while in the active state the dilatation of the intralobular arteries lessens the resistance in the alveolar vessels, and at the same time the flow of the secretion by distending the ducts diminishes the lumen of the capillaries in their walls and thus throws more blood into the capillaries of the alveoli. It is probable that the epithelium of the small ducts takes part in the secretion of the saliva.

The Development of the Salivary Glands.

Prof. Chievitz, of Copenhagen (*Archiv f. Anatomie,* November, 1885), divides the mass usually described as the sublingual gland into the *alveolingual glands,* which open into the mouth by the ducts of Rivini, and the *sublingual gland* proper, from which the duct of Bartholin springs, the latter portion being, however, by no means constantly present in man. All the salivary glands take their origin as buds of the epithelial lining of the mouth cavity. The submaxillary gland is the first to appear, being present in the human embryo of the sixth week as a process of the epithelium at the bottom of the alveololingual sulcus. The epithelium becomes considerably thickened at the spot where the submaxillary process springs from the sulcus, and the sublingual gland begins as an offset from the outer side of this thickening. Absence of the sublingual gland is due to a want of development, and not to subsequent atrophy of the process. At the eighth week the bud of the parotid gland is seen growing from the lateral angle in which the roof

and floor of the mouth meet, and situated in the same frontal plane as the submaxillary rudiment. By the tenth week the alveololingual glands have appeared as buds in the alveololingual sulcus external to the position of the submaxillary gland. The submaxillary process is placed at first altogether behind the lingual nerve, and as it lengthens its oral extremity advances, so that the duct is thus made to cross the loop of the nerve. The parotid rudiment grows backward over the masseter muscle, and only when its extremity has reached the retromaxillary space does it begin to give off secondary buds, with the exception of an ascending branch to form the socia parotidis.

A lumen is soon formed in the main ducts, but in the parotid the last branches are still solid at the beginning of the fifth month. In the serous glands the epithelial cells of the smaller ducts and alveoli do not fully develop their special characters until after birth. In the alveololingual glands mucin-cells are present, and some of the alveoli are excavated by the sixteenth week. The epithelium of the mucous alveoli is single-layered, and the lunulæ of Gianuzzi are the result of sections not passing through the lumen. The growth of the glands after birth is entirely due to enlargement of the ducts, and especially of the alveoli, and not to the formation of new buds.

The Articulations of the Costal Cartilages and the Position of the Heart.

Prof. Karl Bardeleben (*Jenaische Sitzungsberichte*, July 31, 1885) finds that an articulation between the fifth and sixth costal cartilages is present on the right side in sixty per cent. of subjects, on the left side in forty per cent. The articulation between the sixth and seventh cartilages is very rarely absent. An eighth sternal rib occurs in more than ten per cent. He considers that the human thorax is undergoing retrogressive development, leading to a reduction in its length, and that the same is the case with the dorso-lumbar portion of the vertebral column.

The position of the heart is subject to more frequent and greater variations than Henke admits. The pulmonary valves may lie behind the second intercostal space, the third cartilage, or the third space; the apex of the heart opposite the fifth rib or fifth interspace.

On the Level of the Diaphragm, the Extent of the Pleura, and the Position of the Arterial Orifices of the Heart.

C. Sick (*Archiv f. Anatomie*, November, 1885) has made observations on a number of subjects, both adults and children, by thrusting needles through the thoracic wall, as to the variations in the level of the right vault of the diaphragm, the course of the margin of the left pleura behind the sternum, and the position of the aortic and pulmonary orifices in relation to the chest-wall.

He found that the height of the right vault of the diaphragm varies from the level of the fourth to the seventh chondro-sternal articulation, but is most frequently (in 17 out of 34 cases) opposite the sternal extremity of the fifth cartilage; it tends to be lower in old persons.

The course of the anterior margin of the left pleura is recorded in 23 adult subjects. In 17 of these it was still behind the sternum at the level of the articulation of the fifth cartilage; in 10 the line had not yet crossed the edge of the sternum at the sixth cartilage, and in 4 it was less than 1 cm. distant. At the seventh cartilage, in 9 cases the pleura still reached the sternum, or was reflected on to the diaphragm at a higher level; in 2 it was less than 1 cm. from the edge of the sternum. In 12 children, the line of reflection of the left pleura was, opposite the fifth cartilage, always behind the sternum; at the level of the sixth cartilage still behind the sternum 8 times, and 3 times not more than 3 mm. distant, while at the seventh cartilage in 8 cases the pleura either reached the sternum or had already passed back on to the diaphragm. The greatest distance of the pleura from the edge of the sternum at the level of the fifth, sixth, and seventh cartilages, in the adult, was 3, 4, and 5 cm. respectively. The author recommends that, in order to be sure of avoiding the pleura, puncture of the pericardium should be practised at the left edge of the ensiform process through the so-called cleft of Larrey in the diaphragm, or by trephining the lower end of the sternum, or by resecting a portion of the sternal end of the sixth or seventh costal cartilage.

The aortic and pulmonary valves, in 27 cases, were placed opposite the second intercostal space once (in a child of two years), the third costal cartilage 12 times, the third interspace 5 times, the fourth cartilage 5 times, the fourth interspace once, and the upper edge of the fifth cartilage 3 times (all old persons). Braune's statement that the position of the arterial orifices becomes lower with advancing age is thus confirmed.

The Injection of Anatomical Preparations.

A. K. Bjeloussow recommends (*Archiv f. Anatomie*, November, 1885) for this purpose a mixture of borax and gum-arabic. The mass is injected cold, and is then fixed by immersion in spirits. By treating the preparation with glycerine the injection is rendered transparent; and it can be removed at any time by acting upon it with dilute acetic acid.

The Origin of the Ligaments of the Ovary and Fallopian Tube.

In the female embryo, so long as the ovary occupies its original position in the lumbar region, a fold of peritoneum, which was figured by Vrolik in the human fœtus, and described by Kölliker in the cow, descends from the diaphragm to the closely adherent upper ends of the ovary, Fallopian tube, and Wolffian body. Within this fold C. Wieger (*Archiv f. Anatomie*, November, 1885) has traced a band of plain muscular tissue passing from the diaphragm to the Wolffian body, and constituting a *phrenico-Wolffian ligament*. With the descent of the ovary, the ligament is lengthened, and its upper part gradually disappears. The lower part, on the other hand, widens and, its marginal fibres becoming attached to the ovary and the extremity of the Fallopian tube, acquires the form of an inverted Y, the inner branch of which passes to the ovary and the outer to the tube, while the atrophied Wolffian body, or parovarium, occupies the intermediate angle. Through the further shrinking of the parovarium, the χ becomes a λ, and the peritoneal covering of the ligament is raised into corresponding folds. The lower transverse fold

constitutes the ligamentum infundibulo-ovaricum, and the vertical fold is the ligamentum infundibulo-pelvicum. Wieger also describes the development of the ligament of the ovary, as well as the round ligament of the uterus, from the gubernacular band, which descends from the Wolffian body to the inguinal region.

PHYSIOLOGY.

UNDER THE CHARGE OF

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Calorimetry.

M. Charles Richet, after an exhaustive historical sketch of the subject, describes a new apparatus for estimating the amount of heat produced by a warm-blooded animal in a given time under varying circumstances.

It consists of a double-walled chamber, the intermural air space being in connection with a water chamber, to which is attached a measuring apparatus composed of a siphon—adjustable to avoid pressure differences—and a graduated tube for receiving the overflow of the liquid displaced by the expansion of the air between the walls of the chamber in which the animal is placed. The bulk of water displaced is first carefully estimated by substituting a known amount of water of a given temperature instead of the animal, so that the amount of water in the place of the animal, multiplied by the fall of temperature observed, gives the number of *calories* imparted to the instrument. By noting the amount of water caused to overflow by a given number of calories, a table of arbitrary constants may be drawn up, so that it is only necessary to read off the amount of the overflow to find the corresponding amount of heat given off. If necessary, a graphic method may be employed. He experimented with infants, dogs, rabbits, guinea-pigs, and birds.

He found that the size of the animal had an important influence on the quantity of heat produced, viz., with the increase of volume there was observed a direct diminution of the amount of heat produced per kilogramme of the weight of the animal. This, he thinks, depends on the change in relation of surface to the cubic displacement—measured by weight—so that if the animals be reduced to their proximate spheres, the amount of heat given off per unit of surface area is found to be remarkably similar in all classes of animals. The heat production also varied with the external temperature, and reached a maximum at medium temperature (about 13° C. for rabbits). The diminution at the higher grades of external temperature, he thinks, depends on the physical law, that with diminished temperature-difference between two media a diminution in the rate of radiation occurs, so the nearer the external temperature approaches that of the animal, the less loss of heat is recorded. The decrease of heat-output found at lower temperatures he considers to depend upon purely physiological grounds, viz., on the fact that the nervous

system takes some time to become accustomed to the increased production of heat necessary to keep up an even temperature after a fall occurs, and the vasomotor mechanisms check the rapidity of the radiation. Further, the kind of covering of the animal causes a difference in the amount of heat registered, being greatest with naked animals (infants), and least with birds. He concludes: The amount of heat produced by a normal animal depends on three principal factors, viz.: (1) The surface of the animal (*i. e.*, the less the volume of the animal the greater relative surface is exposed). (2) The external temperature. (3) The condition of the tegumental coverings, since radiation is less in proportion as the coats are thick.

In a subsequent paper he gives the result of experiments on rabbits under varying conditions, and finds: (1) Animals deprived of hair give off fifty per cent. more heat and rapidly loses body weight. (2) Rabbits whose coat is partly oiled give out considerably more heat; in one example the animal lost nineteen per cent. of its weight in twenty-four hours. (3) When the surface of the animals is moistened with water they give out more heat; not only while wet, but also after they have been carefully dried; this, he thinks, indicates that the nervous system has "ordered" an excess of production of heat which persists for some time after the cause of its requirement has been removed. (4) White rabbits radiate less than dark ones, a fact which may be explained on physical grounds. (5) Animals stimulated electrically radiate more heat as well as increasing the absolute body temperature during the stimulation. (6) The elevation of the body temperature produced by cocaine, mentioned by Laborde, depends on an increased production of heat, for the quantity of heat radiated is also increased by this drug. Cocaine, then, must accelerate the chemical change of the tissues, and "gives fever" by stimulating the nerve centres. (7) He confirms the statement that the nerve centres influence the body temperature, and calculates that the production of heat may be increased fifty per cent. by direct irritation of certain parts of the cerebral cortex.—*Archives de Physiologie, Normale et Pathologique*, 30 Sept., 15 Nov., 1885.

Photographic Record of the Pupillary Movements.

Dr. Bellarminoff, working in the laboratory of Prof. Tarchanoff in St. Petersburg, employs instantaneous photography for making a record of the movements of the iris. Hitherto much difficulty has been found in making accurate measurements of the rates of movement, etc., of this muscle, as the period occupied by the changes in the pupil could only be estimated by direct observation of the eye without any exact standpoint by which to gauge the time. He employs an ordinary photographic apparatus, to which a dark-chamber with a revolving drum is added. The image is thrown on a sheet of very sensitive paper, which is made to move evenly across the axis of the instrument in the position of the screen; the rate of movement of the paper is shown by a time-marker. Only those rays which pass through a narrow slit placed in front of the observed eye reach the dark-chamber, and affect the sensitive paper, so that the changes in one diameter only are recorded. The head is firmly fixed, and the eye placed in such a position that the slit corresponds to the centre of the pupil. The eye is then well illuminated.

In blond men, white rabbits, cats, and some other animals with blond irides, the distinction between the iris and other parts is sharply marked, so that the pupil causes a white band to appear on the paper. Variations in the diameter of this band allow the extent, duration, etc., of movements of the iris to be accurately determined by comparison with the record of the time and of the period of stimulation which are simultaneously recorded on the paper.

The application of the method is still engaging his attention, and he refrains from giving many results.—*Arch. f. d. Gesam. Physiologie*, 13 Oct. 1885.

Photohæmotachometer.

Dr. Napoleon Cybulski, by an ingenious method, makes a continuous photographic record of the changes in the velocity of the blood current. Since the velocity of the stream bears a constant relation to the pressure-difference at any two given fixed points, he measures the pressure of two neighboring parts of an artery with a differential manometer of special construction, the limbs of which are so close together that a ray of light passing through a narrow slit may pierce each tube and throw the shadow of the contained fluid on the moving sensitive photographic paper. The height of each column of liquid can be thus recorded and the difference in pressure which corresponds to certain velocities having been determined by calculation, the difference of level at which the two columns of fluid stand in each tube may be taken as indicating the velocity and read off from the photographic record. By this means the rapid changes in velocity dependent on the different phases of the heart's cycle can be readily seen. In the carotid of a dog the rate during systole was found to be 248 mm., while that during diastole was only 127 mm. Several photograms are given which show the relation of the changes in blood-pressure and rate of breathing to the velocity of the blood before and after experiments on the vagi.—*Archiv f. d. Gesam. Physiol.*, 5 Nov. 1885.

Chemical Changes in Muscle.

Max von Frey and Max Gruber, working in the Leipsig Physiological Institute under the guidance of Ludwig, constructed a new apparatus for investigating the above question.

It consists of a set of perfectly air-tight tubes through which defibrinated blood may be repeatedly conducted to the bloodvessels of the organ, or part to be investigated. In connection with various parts of the tube are: 1. An artificial lung, consisting of a chamber so devised that the extensive surface of a thin layer of blood is exposed to air in which the amount of oxygen is kept constant, fresh oxygen being supplied to replace that used up by the blood during its passage through the artificial lungs. The CO_2 is removed from the chamber by pumping the air through baryta water, as in Regnault and Reiset's method. 2. Special apparatus for estimating the amount of oxygen used and the amount of CO_2 formed, and also arrangements by which the exact percentage of these gases in the artificial lung can be determined. 3. A mechanical motor by which the blood can be pumped onward in one direction, and the velocity of flow nicely regulated. 4. Warming and cooling apparatus, by which the temperature of the blood in either the lung or the

tissue can be raised or lowered at will. 5. Arrangements for taking samples of blood from various portions of the tube, in order to control the gas analyses made by the other methods.

The experiments, which are communicated in a separate paper by Max von Frey, were carried out on the posterior part of dogs. After the death of the animal, the viscera were removed and their bloodvessels secured. The aorta and vena cava were then connected with the tubes containing the blood, and hemorrhage from the cut surfaces was prevented by a special clamp. The artificial circulation was continued for several hours (in one case seven); so that the results did not depend on a single sample of blood, but upon the continued determination of the requirements of the tissues during a considerable time. The amounts thus obtained were so great that the possible errors were reduced to a minimum.

With regard to the amount of oxygen used up by the preparation the following facts were determined: It was much below that calculated for the normal animal by Regnault and Reiset. Temperature had a marked effect on the absolute amount of oxygen used, and also upon the change of amount toward the end of the experiment. The average amount used per kilo of preparation in every half hour was 22 cm. at the room temperature (18°–20° C.), while the average amount used when at about the body heat (36°–37° C.) was 51.5 cm. per kilo in half an hour—*i. e.*, 100 : 234. In the "warm experiments" the amount fell toward the end of the experiment, but at room temperature the same standard of absorption of oxygen continued throughout.

Considerably more oxygen was consumed by the muscles while contracting, the average proportion of O used by the muscles at rest and during contraction, for the cold experiments, being 100 : 196.5, and for the warm 100 : 135.2 respectively. The increment was always much greater when the temperature of the preparation was not raised above that of the room.

With regard to the absorption of carbonic acid by the baryta-water valves, it was found that as the pressure of CO_2 in the lung chamber was kept nearly at zero, much of the CO_2 which really belonged to the blood came off from it. This occurred at the early part of the experiment; and as the blood became poor in CO_2, the amount taken up by the baryta became less and less. In order to determine the amount formed in the tissues, it therefore became necessary to estimate the volume per cent. of CO_2 in the blood before and after the experiment, and subtract the difference from the total amount found in the baryta.

In two "cold experiments" the average amount of CO_2 given off by the preparation was 32.6 and 33.5 cm. per kilo in half an hour while at rest. When the muscles were stimulated the amount rose to 50 and 43 cm.—*i. e.*, 100 : 156.2 and 100 : 133 respectively. In three experiments at the body temperature the average amount of CO_2 given off during rest was 52.5, 61, and 57 c. cm. In the same experiments, when the muscles were contracting, 62, 86, and 66 c. cm. were given off, thus showing an increment in the proportion of 100 : 118, 100 : 141, and 100 : 115.5 respectively. As in the case of the oxygen, the contractions caused a smaller increment of CO_2 in the heated than in the muscle at the ordinary room temperature, but the difference in the amount of CO_2 was less than that of the O with the same fall in temperature.

On account of the increment of CO_2 being less than that of the O during

contraction, and the remarkable way in which the blood parted with its normal CO_2, it was considered that during the period of contraction the O must be used in the production of some other substance, probably lactic acid.

The quantity of lactic acid given out was found to be surprisingly great. In order to determine the amount, one sample of blood was taken before the commencement of the experiment and another after its termination. The analysis showed an increase from 0.1616 gramme to 1.480 gramme of the zinc lactate in the 1200 c. cm. of blood, during three hours' passage through a preparation weighing 3980 grammes.—*Archiv f. Anatomie und Physiologie; Physiol. Abtl.*, Nov. 5, 1885.

The Activity of the Epithelium of the Glomeruli.

J. G. Adami, of Cambridge, working with Haidenhain in the Physiological Institute of Breslau, repeated Nussbaum's experiments on the renal secretion of the frog. He concludes that Nussbaum's method of ligaturing the renal artery is not applicable as a sure means of determining the path by which a substance passes out through the kidney, and founds his opinion on the following facts: Finely divided coloring matters appear in the glomeruli if introduced into the blood after the ligature of the renal arteries. If laky blood be injected into the vessels of a frog after ligature of the renal arteries, the hæmoglobin is eliminated by the glomerulus, and appears in the shape of menisci in the capsules. Further, the urinary flow frequently begins again some little time after ligature of the renal arteries. As the excretion of the hæmoglobin by the glomeruli occurs when there is no apparent passage of water, it would seem that the glomerular epithelium has properties of a definite secretory nature. Again, in the dog, when by section of the spinal cord in the cervical region the blood-pressure is lowered below 40 mm. of mercury, and the urinary flow brought to a standstill, injection of laky blood was succeeded by the appearance of hæmoglobin in the capsule chambers of the glomeruli, although there was no visible contemporaneous excretion of water. Hence, here, too, the glomerular epithelium must be looked upon as possessing powers of a selective secretory nature. Further, a comparison of the amount of hæmoglobin in equal quantities of urine and blood serum in dogs in which hæmoglobinuria had been induced, showed that there could be more than three times as much hæmoglobin in the former as in the latter, while the lymph contained but from a half to a fourth of that present in the serum.

Certain points seem to indicate that sodium nitrate has a direct action of a diuretic nature on the glomerular epithelium, causing a great increase of the watery outflow, and it is assumed that other diuretics, including urea, act in the same way.—*Journal of Physiology*, November, 1885.

The Sugar-forming Function of the Liver.

In response to Hofmeister's recent adverse criticism (*Archiv f. exp. Path. und Pharm.*, xix.) of the view that sugar was formed in the liver out of peptone, Prof. Seegen, of Vienna, gives the details of some experiments in which he found that the quantity of nitrogen yielded from 100 c.c. of fresh arterial blood mixed with fresh liver tissue, and treated with a current of air for some hours, was greater when a small quantity of peptone had been added.

The quantities of nitrogen in six experiments were:

Without Peptone.	With Peptone.
0.113	0.300
0.050	0 105
0.043	0.092
0.114	0.252
0.140	0.216
0.070	0 159

The peptone and other proteids having been completely removed before the nitrogen was estimated, it must have come from the products of decomposition of nitrogenous materials, and it appeared doubtless to him that in the presence of arterialized blood the liver cells split peptone into sugar and some crystalline nitrogenous product, and he believes that at least in the case of carnivorous animals, one of the chief duties of the peptone is to form sugar.

In a second paper Prof. Seegen gives three experiments on dogs by which he attempted to settle finally the vexed question whether a diet of cane sugar causes sugar to appear in the urine. He found both cane and inverted sugar in the urine in all three experiments.

In a third paper he brings forward elaborate arguments to prove that the production of sugar in the liver is not—in contradistinction to the production of glycogen—interrupted by inanition or increased by abundant carbohydrate ingesta, but is an independent and unintermittent function of the tissue changes.—*Archiv f. d. Gesam. Physiologie*, Bd. xxxvii., November 5, 1885.

Development of the Sympathetic Nerve.

Dr. A. Onodi, working out the development of the sympathetic system in fishes, confirmed, in all essential points, the principles laid down by Balfour, namely, that the ganglia of the sympathetic are formed from the same mass of primitive tissue from which the primary nervous centres are developed.—*Archiv f. Microscop. Anat.*, November, 1885.

Papain.

Dr. Sidney H. C. Martin, in investigating the properties of the proteolytic ferment "papaïn" obtained from the juice of the unripe fruit, stem, and leaves of Carica papaya, found that it is most active in weak alkaline solutions, but it acts well in neutral media. It acts less energetically than trypsin, but the products formed are the same. The papaïn is closely associated with a special form of albumose which he calls *α-phytalbumose* in contradistinction to a *β-phytalbumose*, both of which are present in the papaw juice, and are the proteids upon which the ferment normally has to act.—*Journal of Physiology*, November, 1885.

Relationship of Urea Formation to Bile Secretion.

Dr. D. Noel-Paton finds that the drugs that Rutherford described as stimulants to the bile secretion, also had the effect of increasing the elimination of urea, and (without examining the bile secretion of the animals experimented upon) concludes that the formation of urea in the liver bears a very direct relationship to the secretion of bile by that organ.—*Journal of Anatomy and Physiology*, January, 1886.

MATERIA MEDICA, THERAPEUTICS, AND PHARMACOLOGY.

UNDER THE CHARGE OF

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Gymnocladus Canadensis: the Kentucky Coffee Bean.

This has been the subject of a research by Dr. Bartholow in the Laboratory of Experimental Therapeutics of the Jefferson Medical College. A preliminary report is now made.

It has been known that the coffee bean possessed a certain toxic activity. Flies have been observed to be stupefied by it. As it belongs to the same natural order as physostigma—Calabar bean—it would be supposed, *a priori*, to have analogous powers. Experiment confirms this view. The experiments were made with a concentrated aqueous extract, furnished by Prof. J. M. Lloyd, of Cincinnati.

Gymnocladus was found to affect sensibility, and afterward motility. The area of distribution of the fifth nerve appears to be the last part of the sensory nervous system to retain its irritability. In ten minutes after injecting, subcutaneously, ten minims of the extract in frogs, there was complete sensory paralysis, so that no strength of irritation caused muscular movements. Spontaneous movements ensued, however, and when the skin of the face, or of the eyes, was touched, the lids closed. Vision was chiefly concerned in this response. When the effects attained the maximum, there was universal anæsthesia, and the cerebrum began to be stupefied. With the first impression, vision was rather keen, and the attention lively, but as the effects deepened a soporose state came on. Then the cornea became anæsthetized, so that on irritating it no movements of the eyelids took place, unless the attention was roused enough to direct the vision to the approach of objects.

As regards the motor nervous system, the first effect is a spastic condition of the voluntary muscles generally—the whole body passing into a state of continuous rigidity, followed by paresis beginning in the hind extremities. The motor nerves do not lose their irritability, nor do the muscles fail to contract on indirect and direct stimulation. When the full effects of gymnocladus are produced, and the sciatic nerve stimulated by the faradic current, the calf muscles are thrown into active contractions, and the muscles directly irritated respond energetically. The effects are therefore central and not peripheral. The spastic condition of the voluntary muscles does not entirely cease, and the paralysis throughout wears an aspect of rigidity.

Gymnocladus slows the heart by stimulating the vagus, thus increasing inhibition; afterward with the toxic action reduces its force by an impression, probably, on the cardiac motor ganglia. The number of pulsations of the heart in frogs is reduced one-half. Some lowering of the arterial tension was also noted after the considerable rise first caused by the action of the agent.

From the above experimental data, it is obvious that gymnocladus promises rich returns to the clinical experience of the future.

Polyganum Hydropiperoides.

This member of our indigenous materia medica has, oddly enough, excited but little attention notwithstanding its remarkable powers. The first effort to attract professional notice to it, as a remedy, was made by a student of the Medical College of Ohio, in 1832, who submitted a thesis for the Doctorate on Polyganum Hydropiperoides as an emmenagogue. This thesis has been read by the writer. At that time, the late Dr. John Eberle was Professor of Practice in that college, and it is believed read the essay, and incorporated so much of it as suited his purpose in the succeeding editions of his treatise on therapeutics.[1] He says, in regard to its use in amenorrhœa, that "with no other remedy or mode of treatment has he been so successful as with this." The late Prof. M. B. Wright, M.D., of Cincinnati, the well-known obstetrician, had an equally high opinion of its value, as he personally informed the writer, and constantly prescribed a saturated tincture for this purpose. At my suggestion, an experimental investigation of its physiological actions was undertaken by Mr. J. Elmer Porter, of the graduating class of 1885–86, in the Laboratory of Experimental Therapeutics of the Jefferson Medical College. I subjoin a condensed summary of his conclusions:

General effects, studied chiefly on cats. Preparation: the fluid extract; dose ʒij to ʒv, administered by injection into the peritoneal cavity. The smaller of the two doses was recovered from in twenty-four hours; the larger proved to be lethal in cats weighing three and a half pounds.

It caused incoördination of muscular movements, paresis of the hind extremities, and ultimately general paralysis, contracted pupils, stupor gradually passing into coma, increase in the respiratory movements, and slowing of the heart. After some hours—about eight, when the lethal dose is given—an attempt at recovery ensues, consciousness partly returns, but death occurs in about twelve hours (heart failure?). In cats, after death, the right cardiac cavities are distended, the left contracted and empty.

Effects on particulur organs. The motor paralysis is spinal in seat. The motor nerves preserve their irritability, the muscles their contractility.

Sensibility is not impaired, the nerves of sensation retaining their power.

The reflexes are first depressed, and finally abolished, as the action on the spinal cord deepens.

The respiratory movements are first increased in number by stimulation of the respiratory centre in the medulla, but death ensues by paralysis of the respiratory muscles, the heart continuing in action somewhat longer.

The slowing of the heart is not due to stimulation of the vagus or of the inhibitory ganglia, but to an action on the cardiac motor ganglia, which are ultimately paralyzed.

The blood-pressure is somewhat lowered, as the tracings made clearly exhibit, and this effect is due to the depression of the cardiac motor ganglia and of the vasomotor centre in the medulla. Temperature is not sensibly affected.

A decided increase of the secretion of various glands—salivary, nasal, gastro-intestinal, cutaneous, and renal—occurs, and is due to stimulation of the excito-secretory nerves.

[1] A Treatise of the Materia Medica and Therapeutics, fourth edition, vol. i. p. 441.

The abortifacient effects are quite decided. Impregnated animals—cats and rabbits—abort promptly under its influence. This effect, experimentally demonstrated in animals, is comparable to the clinical observations, proving the power of hydropiper in amenorrhœa.

If the effects of hydropiper are compared to those of pilocarpine, a close analogy may be discerned; the differences are rather of degree than kind.

HYPNONE.

Hypnone—the new hypnotic, since its introduction a few months ago, has attracted considerable attention. We place before our readers abstracts of some of the more important contributions.

MM. DUJARDIN-BEAUMETZ and G. BARDET present an analysis of its chemical and physiological actions, and suggestions for its therapeutical employment, in *Bull. Gén. de Thérapeutique*, of January 15, 1886.

Discovered in 1857 by Friedel, acetophenone (hypnone) is a type of a large class of mixed acetones derived from two organic acids—one from the fatty, the other from the aromatic series, whence the name *aromatic acetones*, which has been given to this group of bodies. According to Friedel, the proper title of this substance is *phenylmethylcarbonyle*, but Dujardin-Beaumetz has given it the name *hypnone* as a designation which expresses its physiological properties.

Hypnone is obtained by distillation of a mixture of benzoate and acetate of calcium. At the ordinary temperature it is liquid, but if cooled 4° to 5° it becomes a crystalline mass. As a liquid, it is colorless, very mobile, and boils at 198° C. Its density is nearly that of water. One cubic centimetre contains 39 or 40 drops. Each drop weighs about 2½ centigrammes (nearly ½ grain). It is neutral in reaction, but is rather irritating—even caustic—and when applied to the mucous membrane it causes somewhat severe burning pain. It is not soluble in water or in glycerine, but dissolves freely in alcohol, ether, chloroform, benzine, and turpentine. As it has a rather persistent and not agreeable odor, it is difficult to administer. M. Vigier proposes the following as the best formulæ:

Hypnone	1 drop.
Alcohol of 90 degrees	15 minims.
Syrup of orangeflowers	1½ drachms.

Hypnone	1 drop.
Alcohol of 60 degrees,	
Syrup of peppermint . . . . . of each	45 minims.

Dr. Dujardin-Beaumetz thinks the true mode of administering hypnone is in capsule, dissolved in oil or in ether. The capsules may contain 5 to 10 centigrammes (2½ to 5 drops).

Dr. Dujardin-Beaumetz includes in his account of the physiological actions of hypnone, the observations of Grasset, Laborde, Mairet and Combemale, and Dubois and Bidot. After passing in review the phenomena observed in the different classes of animals, he submits the following conclusions:

Hypnone appears to have a triple action: it affects the nervous elements, lessening their functional power; it lowers the blood-pressure; and, in

toxic quantity, modifies the composition of the blood. It is to be included in that group of medicinal agents having hypnotic power by diminishing the cerebral circulation and lessening the excitability of the nerve elements. It is eliminated by the lungs and by the kidneys. According to Popof and Nencki, it is decomposed in its passage through the organism into carbonic and benzoic acids, and is found in the urine ultimately as a hippurate.

Although a poison in sufficient doses, no other effect has been observed in man than sleep. Even when the administration of this agent has been continued for a month, Dujardin-Beaumetz has not observed the denutrition effects noted by Mairet and Combemale in animals, but he never exceeded the dose of 50 centigrammes (about 8 grains). The following are the results of the administration in a healthy man of 20 centigrammes (3 grains), dissolved in ether and given in capsules: At the moment of the rupture of the capsule in the stomach, a sensation of heat is experienced, and in a period which varies from twenty minutes to an hour, the eyes are closed and sleep follows. The sleep is calm; it may be even profound, and the awakening is easy, without nausea and loss of appetite. Sometimes there is a sense of hebetude, or headache. He has observed no other modification of the functions; the respiration and circulation continue normal, and the blood, on spectroscopic examination, exhibits no changes. A notable increase of appetite has been observed in some instances.

The therapeutical applications of hypnone will be confined almost exclusively to the treatment of insomnia. It is neither analgesic nor anæsthetic, and hence in the treatment of insomnia accompanied by pain it is far inferior to chloral. In the wakefulness of phthisical subjects, caused by cough, it proved to have but little effect. Also, in the insomnia of fever, it was found to be less efficient than choral, even than paraldehyde. The special field of its utility is the nervous insomnia caused by cerebral excitation, which results from mental work or alcoholic excess.

In assigning it to the place which he thinks it will permanently occupy, Dr. Dujardin-Beaumetz places hypnone in the class with chloral and paraldehyde, but in a rank much inferior to the former, and scarcely equal to the latter.

After a consideration of the relative merits of the capsules and the perle as a means of administering hypnone, MAYET concludes that the former is preferable. He holds, further, that sweet almond oil is a better vehicle than ether, as the eructations following when the latter is used, are very offensive to the patient.—*Les Nouveaux Remèdes*, Dec. 15, 1885.

THERAPEUTICAL EFFECTS OF ADONIDIN—A GLUCOSIDE, THE ACTIVE PRINCIPLE OF ADONIS VERNALIS.

DR. ARMAUD DURAND, in *Bull. Gén. de Thérapeutique*, Jan. 30, 1886, writes on this subject: *Adonidin* is an amorphous, bitter substance, colorless and inodorous, soluble in ether and in water; but more soluble in alcohol. It contains no nitrogen.

The action of adonidin is exerted chiefly on the heart, but it has, also, decided diuretic effects. It diminishes the number of heart beats—in one instance to 46—and it increases their strength. It raises the vascular tension,

and this effect is produced very rapidly. The feeble and irregular action becomes strong and regular under its influence. Adonidin, however, is without beneficial effect in those nervous troubles of the heart, such as exophthalmic goitre, and similar conditions.

The diuretic action was very marked in various cases in which it was administered, the amount of urine discharged, in some instances, being doubled in quantity.

In very large doses adonidin caused vomiting and diarrhœa, and an acrid, bitter taste persisted for several hours after the vomiting, but these appear to be toxic phenomena, and are not produced by ordinary medicinal doses. It appears to have no cumulative effects. The medium dose is 2 centigrammes ($\frac{1}{4}$ to $\frac{1}{3}$ grain).

The indications for the use of adonidin appear to be the same as those for the use of digitalis. The actions above attributed to it are the same as those ascertained by Bubnow and others in Russia, and by Altmann, Leyden, and others in Germany. It appears to have some advantages over digitalis, in that it is less apt to disorder the stomach, and is less dangerous.

Some New Purgatives.

Under this caption, Dr. Desnos, in a note to the Academy of Medicine (*Bull. Gén. de Thérap.*, Jan. 30, 1886), narrates his experience with that group of cholagogues which were the subject of physiological investigation by Prof. Rutherford, of Edinburgh. Dr. Desnos's study included the following resinoids: Baptisin, sanguinarin, juglandin, and phytolaccin. His conclusions are based on observations made on forty-eight patients suffering from various ailments. With sanguinarin he had only negative results, although given in doses considerably larger than those recommended (60 centigrammes, equivalent to 9 grains). On the other hand, he found baptisin and juglandin to be tolerably certain purgatives and efficient cholagogues, in doses of 20 to 30 centigrammes (3 to 5 grains, in round numbers). Phytolaccin (resinoid of phytolacca decandra—poke) proved to be the most efficient member of the group. In doses of 10 to 20 centigrammes ($1\frac{1}{2}$ to 3 grains), it causes easy and abundant bilious stools. Dr. Desnos summarizes his experiences as follows:

"I conclude, then, that baptisin and juglandin are laxatives which may, perhaps, render considerable service, with the exception of some inconveniences [uncertainty of action, tormina, and tenesmus], and that phytolaccin, which is more certain, and in part exempt from the inconveniences just mentioned, is an important contribution to the therapeutics of constipation."

On the Employment of the Salicylate of Lithium in the Treatment of Rheumatism.

In the treatment of acute rheumatism, as also in acute gout, the salicylate of lithium is quite as effective as the salicylate of sodium. In certain cases of acute articular rheumatism treated with the sodium salt, there comes a period, after rapid and considerable improvement, when the joints still remain somewhat painful, stiff, and swollen, notwithstanding the fact that the remedy is given in doses sufficient to cause toxic phenomena. Under these circum-

stances the salicylate of lithium will cause the last traces of the affection to disappear promptly. It is also more effective in the treatment of progressive subacute articular rheumatism. In patients attacked with this most tenacious and troublesome form of rheumatism, VULPIAN has employed, with the utmost perseverance, the most various medication, including large and repeated doses of the salicylate of sodium, without producing other than the most temporary and insignificant amelioration; and yet he has seen the salicylate of lithium bring about notable improvement in ten to fifteen days. Four grammes (about sixty grains) a day is the quantity of salicylate of lithium usually required. The effects of the remedy begin to be manifest in a half to one hour, and consist in headache—which, however, disappears within a few hours—and vertigo and dulness of hearing, which are more persistent. In some subjects it also causes colic and diarrhœa.

The curative effect of salicylate of lithium is due in large part to the salicylic acid; for, if the other salts of lithium are substituted for it, the same results are not obtained. Some portion of the beneficial effect is, however, due to the lithium, for the salicylate of lithium is more effective than the salicylate of sodium. The rheumatismal manifestations which resist the action of six and seven grammes (ʒiss–ʒij) of salicylate of sodium yield to four grammes (about ʒj) of salicylate of lithium.

To these observations of Prof. Vulpian (*Revue de Thérapeutique*, Jan. 15, 1886), the writer will add that he has found the salicylate of lithium very effective in myalgia or muscular rheumatism, given in the quantity mentioned above—fifteen grains four times a day.

ON SOME POINTS IN CLINICAL THERAPEUTICS.

According to DR. BURNEY YEO (*Lancet*, February 6, 1886), one of the most remarkable gains in the treatment of disease in recent years has been the employment of large doses of iodide of potassium in the treatment of deep aneurisms. In common with many physicians, he has seen more satisfactory results follow this mode of treatment than any other, yet when he first began the use of iodide of potassium in the treatment of aneurisms his results were disappointing, and his belief in the remedy slight. But in the year 1877, on the occasion of the meeting of the British Medical Association at Manchester, he was fortunate enough to see in the infirmary of that city a number of cases of thoracic aneurisms, which had been collected together by Dr. Simpson, for the purpose of showing the members of the Association the value of the iodide of potassium treatment in such cases. It was certainly a remarkable series of cases, and the results were excellent; and it was then he found that whereas in London he and others, who had tried this treatment, had been content with giving five grain doses three times a day, Dr. Simpson had given twenty, thirty, and forty grain doses instead. Now, as soon as he began using these large doses of iodide of potassium in the treatment of internal aneurisms he realized their great remedial value, and he has had the happiness of seeing most admirable results follow the prolonged administration of these large doses. It is only by clinical methods of observation that he could have established a fact of this kind. Many suggestions were made as to the mode of action of the iodide in these cases. The first to be put forward

was that the cases in which the iodide proved of value were syphilitic cases, and that its beneficial effects were due to its antisyphilitic properties. But this view, as Dr. Balfour has pointed out, would only make its action more mysterious. Another suggestion was that the iodide increased the coagulability of the blood, and this it may possibly do; but post-mortem examinations seem to show that the process of cure is obtained chiefly by "some peculiar action on the fibrous tissue," causing thickening and contraction of the walls of the sac. It had been noticed clinically that in some cases under the influence of the iodide, the pulsations in the aneurismal sac and throughout the arterial system were much diminished in force, and this was referred to a reduction in the intra-arterial blood-pressure brought about by the action of the drug. Physiological experiments appear to confirm this view, and to show "that one of the chief actions of iodide of potassium is to lower blood-tension uniformly throughout the body by dilating the arterioles," and, at the same time, diminishing the force of the heart's action.

Dr. Wilks, whose skill, caution, and insight as a clinical observer will be universally admitted, has satisfied himself by clinical observation solely that arsenic has the power of preventing attacks of gout and angina pectoris. He is impressed, too, with its remarkable value in relieving some forms of asthma, in certain neuralgias, in cases of anæmia and impaired nutrition, and especially in certain cases of general cachexia of doubtful origin. Dr. Clifford Allbut has also borne unhesitating testimony of its value in the treatment of many forms of visceral neuralgia. Now these observations, the accuracy of which has never been seriously called in question, are due entirely to the clinical method. Let us see what amount of agreement exists amongst experimental pharmacologists as to the action of arsenic. Sklarek considers his experiments to have demonstrated that arsenic impairs sensibility and leaves the motor functions unimpaired; on the other hand, Ringer and Murrell's experiments, it is maintained, prove that Sklarek's conclusions are incorrect, and that motor paralysis precedes the loss of sensibility. Then it has been established, or, at any rate, authoritatively stated, that the effects of arsenic on the circulation are not the same in warm- and cold-blooded animals; so that inferences from observations made on the vasomotor system of cold-blooded animals cannot be applied to the case of mammalian animals, and, therefore, to human beings. The statement of Saikowsky, that arsenic causes fatty degeneration of the liver, kidneys, heart, and other organs, would scarcely have led us to any great enterprise in its application to the cure of disease, nor does it throw any light on the well-known fact that the arsenic-eaters of Southern Austria and Styria, who take enormous quantities, "improve in bodily condition, gain in breathing power, and become stronger and more pugnacious, and also more salacious." Moreover, it has been stated as the result of experimental investigations, that arsenic arrests the formation of glycogen in the liver, and by one observer that it lessens the excretion of urea (C. Schmidt), and by another (Prof. Gäthgens) that it causes an actual increase of the amount of urea excreted. Dr. Wilks thinks we may fairly say, with regard to the therapeutic uses of arsenic, that we have acquired more precise knowledge from our clinical method than we could have derived from results of pharmacological experiments.

Another fact in therapeutics which could only have been derived from clin-

ical observation is the much greater efficacy which aconite possesses in arresting or modifying the febrile process in children and young people than in persons of mature age. It is quite remarkable how a few doses of aconite will rapidly subdue the febrile attacks which are commonly associated with local inflammation or other disturbances of health in children and young people, while an expectation of the same results in persons of riper years will be attended by disappointment.

Phthisis and its Treatment by Carbolic Acid.

Dr. Filleau (*Revue de Thérapeutique*, Feb. 1, 1886) has just communicated to the Société Medico-pratique the facts of an original and efficacious treatment that has given him the best results in advanced consumption—the treatment by carbolic acid. The carbolic acid must be pure, and in white crystals. When it is impure it becomes colored little by little until it is reddish-brown. It then contains rosaline and rosacilic acid, which may be injurious by their coagulant action on albumen. He employs two methods for administering carbolic acid in the treatment of tuberculosis; the hypodermatic and the stomachic. The process by hypodermatic injections has distinct advantages.

The injections made with a solution of pure carbolic acid are inoffensive; they neither cause abscesses, plegmons, nor even simple nodosities. They are little painful, and the patients never refuse them in any case.

The solution which he uses is this:

Distilled water	95 grammes.
Glycerin, neutral	q. s.
Crystallized carbolic acid	1 gramme.

The dose of carbolic acid can be administered without inconvenience up to two grammes (ʒss). These injections are made in a quantity of a hundred drops, by means of a syringe holding five grammes; they can be given every two days, or three times a week, according to the indications. He inserts the injection as near as possible *loco dolenti*, except in cases of very marked emaciation. For administration by the stomach, he has recourse to the neutral phenoglycerine, which is very well supported by the stomach, and which is prepared according to the following formula:

Glycerin, neutral	400 grammes.
Crystallized carbolic acid	2 "

A teaspoonful contains 15 centigrammes (about 2½ grains). The dose can be raised to four spoonfuls a day, according to the toleration. Dr. Filleau reports many fortunate cases, which permit him to come to the following conclusions:

The parasitic doctrine of tuberculosis being admitted, one is authorized to consider carbolic acid as the best antiseptic to employ against its manifestations. Carbolic acid is the only antiseptic which, up to the present time, can be administered hypodermatically in large doses during an unlimited time without causing accidents. The tolerance for and harmlessness of carbolic acid administered hypodermatically are clearly demonstrated. Under the influence of this medication, the general state of the patient speedily improves. The local state is at the same time advantageously modified.

The treatment in all cases demands, on the part of the patient and of the physician, long persistence.

Injections of Arsenic in Tubercle Ganglion.

Dr. Reclus publishes the treatment of a case of ganglionic affection of strumous or tuberculous nature by interstitial injections of Fowler's solution, where the result was rapid and the success remarkable.

A person twenty-four years old had, in the subhyoidean region a tumor, which was voluminous, and of woody hardness, formed by two hypertrophied ganglia. Extirpation was decided on, but before attempting it Dr. Reclus advised recourse to arsenical injections. The patient, at the same time, was taking arsenious acid internally, in the daily dose of two to six milligrammes.

Twelve injections of Fowler's solution in the ganglion mass were made with a Pravaz syringe, eight drops the first time, then twelve drops the other times, at intervals of four to five days.

The tumor diminished so rapidly in size that after two months of treatment the submaxillary region regained its normal form, and palpation would have been necessary to find in the place of the tumor a hard mass the size of a pea.

Toxic Effects of the Oxygen Compounds of Phosphorus.

Prof. Schultz has lately studied the toxic effects of the compounds of phosphorus with oxygen (*Archiv für experiment. Pathologie u. Pharm.*, 1885, Heft 1). He included in the examination, hypophosphorous, phosphorous, hypo-, meta-, pyro-, and ortho-phosphoric acids. The preparations used were the neutral sodic salts, and the method of administration consisted in the subcutaneous injection in rabbits.

He ascertained that the hypophosphite had no poisonous action. The phosphite, on the other hand, proved to be an energetic poison, acting especially on the central nervous system and on the abdominal glands. The hypophosphate and the meta- and pyro-phosphate acted as poisons on the stomach and intestines, but the orthophosphate was without toxic power. In fine, the poisonous effects were in an inverse ratio to the number of pairs of oxygen atoms.

The deoxidizing action affects especially the cells, and is more energetic than the oxidizing action. Schultz and Binz, studying this subject in collaboration, had already announced this theory in their examination of arsenic. It is always the oxygen displaced, which effects the changes in the cells acted on. In the same way the therapeutical action of these agents—arsenic, phosphorus, antimony, etc.—is accomplished: "they impart a new vitality to those cells in a feeble state."

Schultz explains in this way the action of the whole series of metallic poisons, which produce the same phenomena in a more or less sensible manner, the variations being due to the differences of their affinity for oxygen. Sometimes there are differences due to the fact that the heavy metals form albuminates, which is not the case with phosphorus and arsenic. But this formation of albuminates does not have the importance of a final phenomenon; it is but a means to an end. In the case of gold, silver, and mercury, it is not oxygen, but chlorine, which brings about the results. It is thus, in the

presence of reducible substances that corrosive sublimate is converted into calomel, and calomel is, on the other hand, transformed into corrosive sublimate. Free chlorine in the presence of water, decomposes it, and it is always the active oxygen thus liberated that brings about the results above indicated. In the case of tin, zinc, copper, and silver, it is not yet exactly ascertained whether oxygen alone, or through the intermediation of chlorine, effects the changes. But all of these substances manifest their powers in the same way, the intermediate process differing with each element; and thus it is that the specific energy of each element is the source of its therapeutical value.

MEDICINE.

UNDER THE CHARGE OF

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TYPHOID FEVER.

The hemorrhagic diathesis in typhoid fever. We can scarcely recognize a hemorrhagic variety of this disease comparable to the malignant form of smallpox, scarlet fever, or measles, in which there are early bleedings from the mucous surface and extravasations into the skin. From the description by Griesinger, however, we infer that he had seen cases of the kind, but more commonly the hemorrhages take place late in the disease, and are not of the uniformly fatal significance of the initial bleeding in other specific fevers.

WAGNER (*Deutsches Archiv für klin. Medicin*, Bd. xxxvii.) records nine cases, of which six proved fatal. In only one instance did the hemorrhage occur as early as the tenth day; in the majority it began from the twentieth to the twenty-third day. The blood came from the gums, lips, nose, bowels, and kidneys, and in some instances was found effused in most of the organs. The cases were usually debilitated or scrofulous individuals. GERHARDT (*Zeitschrift für klinische Medicin*, Bd. x.) records five cases, of which three recovered, and deals fully with this condition. He regards it as a late complication, most likely to be met with in delicate or scrofulous persons, but in some cases dependent probably upon the debility due to prolonged fever, the exclusively animal diet, and perhaps upon the cold water treatment. In fifty-three autopsies in typhoid fever at the Montreal General Hospital (*Canada Medical and Surgical Journal*, vol. xiv.) there were five cases which presented hemorrhagic lesions. In one there had been profuse hæmoptysis a week before death. RAYMOND (*Revue de Médecine*, Nov. 10, 1885) reports two cases, in one of which uncontrollable hemorrhage followed the opening of an abscess in the sacral region, and in the other death took place in the second week from meningeal hemorrhage. In the first case there were found extensive alterations in the walls of the bloodvessels in the neighborhood of the abscess associated with the presence of numerous microörganisms.

Nephro-typhoid. Under this term an attempt has been made by certain French writers to establish a "renal form" of typhoid fever, and LONGUET (*L' Union Médicale*, 151–153, 1885) has given a summary of the facts upon which this view is based. Ordinary albuminuria, which occurs frequently in typhoid fever, is, of course, excluded, and the term is restricted to cases in which the symptoms of acute kidney disease develop during the course of the fever. The access is usually sudden, often marked by a chill or chills, epistaxis, headache, delirium, pain in the back, and increase of the fever. With the appearance of the albumen the typhoid condition is aggravated, and the pulse is increased in frequency. The dropsy is usually moderate. The urine is dark colored, and may contain much blood, with epithelial débris and casts. The prognosis is grave; death takes place from asthenia, or, in some cases, with uræmic symptoms. The lesions met with in the kidneys have most frequently been those of diffuse parenchymatous nephritis, and present nothing distinctive. A difficulty in diagnosis arises from the fact that there are instances of renal congestion with marked typhoid symptoms. Such a case is described by A. ROBIN (*Gazette Médicale de Paris*, 1885), in which stupor, dry tongue, and diarrhœa were prominent features; but the early fall of temperature and the absence of spots forced the conclusion that it was nephritis, with the so-called typhoid symptoms. In spite of the absence of pathological evidence, Longuet is induced, on clinical grounds alone, to recognize a form of typhoid in which there are pronounced renal symptoms, the expression of the direct action of the poison on the kidneys.

WAGNER (*loc. cit.*) reports five cases in which acute hemorrhagic Bright's disease developed with the typhoid fever, but did not appear to modify to any great degree the course or duration of the affection. The pulse was perhaps accelerated, and dicrotism was usually absent; sometimes the tension was increased. He holds that the existence of a nephro-typhoid as a distinct form cannot be established until it is shown that the renal affection is specific and dependent upon the action of the typhoid poison. TOUSSAINT (*Archives de Méd. et de Phar., Milit.*, No. 18, 1885) divides the renal complications of typhoid fever into three groups: (a) the albuminuria of the onset; (b) albuminuria in the course of the fever; and (c) albuminuria during the convalescence. In the determination of the nature of the albuminuria, whether due to the existence of Bright's disease or merely to the circulatory or febrile disturbances, this author places great reliance on the presence of the so-called retractile form of albumen, which, with acid and heat, floats as firm flocculi in a clear fluid. Bouchard regards this as a certain indication of the existence of nephritis, while the albumen, which remains in suspension or produces simply opalescence with heat and acid (*albuminurie non-retractile*) is due to the dyscrasia or febrile disturbance. The renal lesion results from the irritation caused by the microörganisms of the disease, which Toussaint claims have been demonstrated in the glomeruli and tubules.

Pneumo-typhoid. GERHARDT (*Berliner klin. Wochenschrift*, 41, 1885) discusses briefly the relations of pneumonia and typhoid fever, and is inclined to regard the cases as examples of double infection, and not as instances of the special local action of the enteric poison on the lungs. He recognizes two groups of cases. A true pneumonia may set in with chill, etc., in a patient who has been ill some time with typhoid fever. The temperature is

elevated, and the complication is necessarily one of great danger. Should the patient succumb, healing ulcers are found in the ileum and fresh croupous pneumonia in one or more lobes of the lungs. In such cases we have occasionally the opportunity of seeing herpes and jaundice, which are rare symptoms in uncomplicated typhoid. In other cases the two diseases set in together, with an intimate commingling of these symptoms, and as hybrid plants sometimes resemble one parent, sometimes the other, so in these cases the pneumonic symptoms may be marked, or again the typhoid features predominate. The onset is usually with a chill or chills, but the patient may continue at work for several days. The lung symptoms develop within the first week, and are pronounced—pain in the side, shortness of breath, cough, bloody sputa, and signs of consolidation. Pain in the head, dulness, pain in abdomen, diarrhœa, and enlargement of the spleen may early suggest the existence of a second disease. In eight cases the typhoid rash was absent only once. Diarrhœa was an early symptom. The general typhoid symptoms frequently set in in the second week. The temperature may fall by crisis, or there may be pseudocrises, after which the fever rises and continues. The prognosis is good. Gerhardt lost only one case in ten years in hospital practice. While suggesting that these cases are due to a double infection with the typhoid bacillus and the pneumonococcus, he admits that future investigations can alone decide the question. This is virtually the position of WAGNER, of Leipzig, whose contribution to the etiology and pathology of pneumotyphus in *Deutsches Archiv für klin. Med.*, Aug. 1884, is the most important which has appeared during the past few years.

Peripheral neuritis in typhoid fever. PITRES and VAILLARD (*Revue de Médecine*, December, 1885) report two cases of paralysis of the ulnar nerve during convalescence from typhoid fever. Atrophy of the muscles followed in spite of treatment. The condition was attributed to a peripheral neuritis such as was demonstrated to exist in a similar case by Bernhardt. In four cases of typhoid in which there were no special symptoms pointing to neuritis, changes were found in the peripheral nerves. They draw the following conclusions: 1. Among the various nervous affections which may develop after typhoid fever, are the peripheral neuritis leading to paralysis of limited groups of muscles, accompanied with pain or anæsthesia, rapid diminution of the electrical excitability, and wasting of the affected muscles. 2. So far, the neuritis has been demonstrated in only one case—that of Bernhardt—but its existence is shown by the analysis of the symptoms and the course of the paralysis. 3. Histological examination shows that in persons dead of typhoid fever, the peripheral nervous system is often the seat of parenchymatous neuritis. When these changes are not very advanced they may be latent or give rise to only ill-defined symptoms, but when more severe they become manifest as the sensory, motor, and trophic disturbances characteristic of peripheral neuritis.

The state of the reflexes in typhoid fever. ANGEL MONEY (*Lancet*, Nov. 7, 1885) finds the knee-jerk much exaggerated and the muscular irritability greatly increased. When the knee-jerks are very marked, spontaneous fibrillary contractions of the muscles occur, and spontaneous contractions of the whole or nearly the whole of the muscle may occur, known as "subsultus tendinum," and with this degree of irritability the ankle clonus may usually

be obtained. The cutaneous reflexes are also increased. These phenomena come on usually in the second week of the disease, gradually increase until the subsidence of the fever, and do not disappear for two or three weeks after convalescence has set in.

Berlin statistics. SENATOR has compared (*Berliner klin. Wochenschrift*, Nos. 45 and 46, 1885) the results of treatment of typhoid cases in the eight Berlin hospitals for the ten years 1875–1884. The Charité and the two city hospitals are excluded, as the patients admitted to them are from the lowest classes, and the mortality is high, being for the Charité, 16.4 per cent.; Friedrichshain, 19.6 per cent.; and the Moabit, 15.2 per cent. In the others the death-rate was as follows: Hertwigs, 14.7 per cent.; Elizabeth, 12.8 per cent.; Lazarus, 14.1 per cent.; Bethanien, 13.5 per cent.; and Augusta, 12.3 per cent. Of the last institution Senator is the medical director, and he shows clearly that the low mortality is not due to favoring conditions of age, sex, or rank of the patients. While in the other hospitals an antipyretic plan of treatment is more or less strictly carried out, and cold baths are frequently given, in the Augusta Hospital the cold water treatment has not been employed, and no methodical antipyretic treatment followed. Senator is not opposed to the cold bath, but he thinks its value as an antipyretic overrated, and not equal to quinine or antipyrin. Its special use is in cases with early stupor and profound nervous symptoms.

Senator's experience is very much in favor of the expectant or symptomatic plan of treatment in typhoid fever, and it is all the more valuable coming from a quarter where the treatment of the disease was becoming largely a matter of antipyresis.

Munich statistics. BUTZ (*Deutsches Archiv f. klin. Med.*, xxxvii.) reports the results of treatment of 899 cases of typhoid fever treated in Von Ziemssen's Clinic, at Munich, from 1878–1883, inclusive. There were 88 fatal cases—9.78 per cent. The mortality in different years ranged from 2.3 to 18.6 per cent. There were 112 cases of relapse, of which 108 happened in the years 1878–1881. The treatment consisted in cold baths and the use of quinine, salicylate of soda, cinchonin, and antipyrin. Cinchonin produced unpleasant collapse and heart-weakness, which ended fatally in two cases.

Typhoid in animals. DR. BLAND SUTTON (*Transactions of the Pathological Society of London*, 1885) has made some interesting observations which go to show the existence of an enteric fever in lemurs, monkeys, and beavers, resembling closely in clinical and anatomical features human typhoid. The etiological connection, however, is still doubtful. As is well known, inoculations in animals with typhoid material have heretofore proved negative. The so-called typhoid fever of the horse, in which the lesions are very distinctive, is stated by one of the latest writers on the subject (Servolles) to be different from the human disease.

ALCOHOLIC PARALYSIS.

In a monograph of 110 pages OETTINGER ("Sur les Paralysis Alcoholiques," Paris Thesis, 1885) gives an extensive and lucid description of alcoholic paralysis. Magnus Huss receives the credit of having been the first to describe this affection. In 1881, Lancereaux published several observations that he had

made, and for the first time clearly indicated that alcoholic paralysis was dependent upon lesions of the peripheral nerves.

The symptomatology is very fully considered. The paralysis is stated never to set in brusquely, but is always preceded by premonitory symptoms, such as disturbed sleep, terrifying dreams, delirium tremens, cerebral troubles, various digestive derangements, lightning pains, and the sensation of burning and tingling in the lower extremities. The latter come on especially toward night, and cause great suffering. At the same time may be noticed a transient œdema of the hands and feet, localized principally on the dorsal surface; cramps and subsultus of the muscles are also common. The motor affection may be of varying intensity, and is divided, according to its degree, into paresis and paralysis. Paresis is the most frequent form, and may only be evident to the patient as a weakness or feeling of lassitude in the legs. These symptoms are more pronounced in the morning on rising, vary considerably from day to day, and undergo considerable exaggeration on the occurrence of febrile attacks or gastric derangements, to which the patients are subject.

Paralysis usually develops slowly and progressively, but it may also develop rapidly, and soon become general. It is necessary to remember, however, that the paralysis is never general at the outset. In the most acute case, that recorded by Broadbent, it took more than three weeks to become general. The paralysis is never complete, and even when the muscles will no longer respond to the faradic current they are still capable of exercising some movement. The muscles are not all equally affected, and, like other toxic paralyses, certain groups of muscles are more likely to be affected than others. The extensors of the big toe are the first to be involved; but it must be mentioned, however, that the flexors do not escape. The paralysis may be limited to the inferior extremities, and this is the most common form. If the paralysis extends to the upper extremities, the extensors, as in the legs, are the first to be affected. A singular feature of the paralysis is, that it does not attack the muscles of the face, even when it becomes general. The absence of visceral disturbances warrants the inference that the paralysis does not affect the sympathetic nerves.

The author does not think that alcoholic ataxia deserves to be considered as such. He regards it as a complement of the paralytic phenomena. He does not agree with Wilks that the paralysis may be accompanied by contractions; the muscles, he says, are always flabby and flaccid.

Hand in hand with the paralysis proceeds atrophy of the muscles, which Oettinger considers as secondary to the paralysis. The author's results with electricity coincide with those of Dreschfeld and others. In common with other writers, he draws attention to the hyperæsthesia, with impairment of the tactile sense. When the muscular paralysis is profound, anæsthesia often replaces the hyperæsthesia. Much importance is attached to the vasomotor and trophic disturbances. These consist in transient redness of the skin, profuse localized sweatings of the back, the dorsal surface of the hands and feet. Œdema of the legs is very common, and in the graver forms of paralysis is never absent. Purpura is relatively rare. Trophic disturbances are manifested by the shining appearance of the skin, the brittle, glistening state of the nails, and the hypertrophy of the cellular tissue of the skin, which renders the latter brawny and indurated.

The pathological anatomy of the nerves was studied after Ranvier's method. The alterations in the nerves observed resembled those following the section of a nerve. There were increase of the cellular nuclei, tumefaction of the protoplasm, and breaking up of the myelin into lumps. Later on, the axis-cylinder breaks up, and after a time disappears, whilst the myelin becomes gradually absorbed. In an advanced stage the nerve is reduced to its sheath, all of its nervous elements having disappeared. These changes may be observed in the nerve trunks in parts, but are best seen in the nerves furthest from the centre. The author does not think that we can, as yet, answer the question, how high the lesion extends. Whether the lesion starts in the motorial end-plates, or in the terminations of the sensory nerves, he thinks, must remain, for the present, an unsolved question. He holds that the change is limited to the parenchyma of the nerve, though Hadden reports a case in which he found interstitial neuritis. To decide the question whether the motor or sensory nerves are most implicated, will require a greater number of anatomical examinations than has, as yet, been made.

The branches going to the skin particularly show the pathological changes in an exquisite degree. These become converted into fibrous cords, the sheath being the only structure of the nerve remaining.

In one of the author's cases the sensory nerves showed an advanced degree of the pathological change which explained the anæsthesia that had been present prior to death. Yet the author is of the opinion that the motor nerves were the most implicated. In all the cases examined, the anterior and posterior medullary roots have been found healthy. The same remark applies to the medullary substance of the cord. It is natural to conclude, therefore, that the lesion in alcoholic paralysis lies in the peripheral nerves.

The muscles appear of smaller volume, paler color, and of more friable consistence. The striæ are less visible, less distinct, and in some cases the muscular substance undergoes granular degeneration. These changes are not extensive, however, for a great number of the fasciculi were found quite healthy among the diseased ones.

Among the pathological changes in the organs worthy of mention, is the frequency which tubercle of the lungs is met with. The tubercles are characterized by their abundance and confluence rather than by their tendency to the formation of large excavations. Acute affections of the lungs are common, and frequently carry off the patient. The author concludes that all the phenomena observed in alcoholic paralysis can be physiologically explained by a lesion of the peripheral nerves without implication of the cord. Regarding the etiology, it is noteworthy that in England at least seventy-five per cent. of the cases have occurred in women, in whom delirium tremens is less frequent than in man. But in other countries this disproportion in the sex has not been observed. Of the eight cases published in Germany, all were men. Only the strong liquors, especially those of poor quality and containing much fusil oil, are capable of producing paralysis. Wine-drinkers do not suffer from this disease. Wilks and Lancereaux hold that the essential oils contained in the liquors are the toxic agents. Two cases reported by Lancereaux strongly confirm this view. The cases occurred in two women who had lived night and day, for a long term, in shops containing methyl- and amyl-alcohol in wooden

and other vessels. They suffered from typical alcoholic paralysis, though they neither drank alcohol in any form.

The monograph contains the clinical records of sixteen cases, including the cases hitherto unpublished in France, and some of the published cases of other countries, but which had not, as yet, been published in France.

In an article of considerable length (*Neurol. Centralb.*, Nos. 19, 20, 21, 1885) DR. RICHARD SCHULZ gives a critical review of our existing knowledge of alcoholic paralysis, together with a detailed report of a case that came under his observation. The patient, aged thirty-three, who had been a very hard drinker, was admitted into the hospital on September 16, 1884. Though quiet, his mind was so confused that nothing could be obtained about his history. Later on, as his mind grew clear, the following facts were elicited: that his parents were living and healthy; that no neurosis existed in his family; that the patient himself lived irregularly and drank hard, in consequence of which he had had several attacks of delirium tremens. His present illness began at the end of August, 1884, with dizziness, and weakness in the lower extremities, which rapidly increased.

The following is a brief synopsis of the record during the patient's stay in the hospital. At first he lay in a state of apathy, complaining of seeing objects, and muttering nonsense to himself. There was marked convergent strabismus, the paralysis being most marked on the right side. Pupils were moderately narrow, equal, and reacted fairly well to light. On endeavoring to make the patient stand, his legs gave way from under him. The muscles of the extremities were markedly emaciated. Sensibility was apparently intact. The patellar reflex was absent, the abdominal and plantar reflexes were perhaps exaggerated. The patient passed stools and urine in bed, and lay in a semi-confused state, at times giving intelligent answers to questions. Nine days after admission, an examination with electricity was made, which showed marked diminution of the electrical irritability of the nerves and muscles without any qualitative changes. On the 29th of September, thirteen days after admission, the patient complained for the first time of pains in the arms and legs. On the 4th of October a slight degree of fever was present, which reached as high as 40.2° C. Several of the joints were swollen and red. These symptoms disappeared under the administration of salicylate of soda. November 9th, improvement began to be manifest; the patient became reasonable, and the patellar reflex could be slightly elicited. The ischiatic and brachial nerves now gave evidence of considerable tenderness on pressure. Seventeen days later reaction to the faradic current exhibited itself. From this time on, the patient made a gradual but steady recovery, and was discharged on the 16th of March as cured. Measurements of the extremities at this period showed that they had increased 2 cm. (1¼ inches) in circumference.

Commenting on the case, Schulz says the diagnosis was particularly difficult. Progressive paralysis could not be excluded at first. The diagnosis of poliomyelitis anterior appeared to be most plausible. The author would attribute the involuntary passages of the stools and urine rather to the patient's mental condition than to a paralysis of the nerves supplying these parts. As the patient's mind grew clearer, Schulz became convinced that the affection was one of multiple neuritis. He bases his diagnosis on the following facts: the multiplicity of the processes which had affected the nerves of the extremities

and the abducens; the high degree of atrophy, with the marked diminution of the electrical irritability without any qualitative changes; the slight disturbances of sensibility; the absence of the tendon reflexes, the superficial reflexes remaining normal; and the tenderness, on pressure, of the great nerve trunks. In favor also of the diagnosis was the return of the electrical irritability and the termination in recovery on the withdrawal of alcohol. To meet the objection that the disease might have been due to a central lesion, cases published by other authors are quoted which had presented a similar train of symptoms, and in which an autopsy revealed a normal cord with degeneration of the peripheral nerves.

Schulz agrees with Dreschfeld and Strümpell that there are two forms, one with a predominance of the ataxic symptoms with very little paralysis, the other with marked paralysis. It is important from a prognostic point of view to differentiate alcoholic ataxia from tabes. The differential diagnosis lies in the relatively more rapid course, in the earlier appearance of atrophy, which is a very late symptom in tabes, and in the marked diminution of the electrical irritability. Further points of differential diagnosis are, as Strümpell has stated, the absence of the Argyll-Robertson pupil, the girdle sensation, and disturbances of the bowels and bladder. A slight degree of fever is present in nearly all of the alcoholic cases.

The pathology of these cases is far from being settled. Many neurologists are of the opinion that the affection is not a pure multiple neuritis; they say that the cord also is affected. Schulz believes that the pathological changes are limited to the peripheral nerves. The vacuole formation in the ganglion cells in the anterior horns of the cornu, which has received so much attention recently, he considers as an artificial formation and not a pathological change. Charcot is quoted as being of the same opinion.

At the conclusion of the paper eleven cases by various authors are given in tabulated form. An analysis of these presents the following facts: Five died, four were cured, and two were improved. Of the five cases that terminated in death an autopsy revealed degenerations of the peripheral nerves in all, while the cord was found normal in each case. No mention is made of the condition of the brain and its membranes. The other phenomena resemble, for the most part, those in the author's case as described above. It may be of interest, however, to note the electrical reaction. In six cases the faradic reaction of the muscles was diminished, in three it was extinguished, in one it was fair, and in one it was not stated. The galvanic current showed the reaction of degeneration present in five cases, in ten other cases the current called forth slow and vermiform contractions of the muscles.

Dr. J. Dreschfeld contributes a valuable article in *Brain*, January, 1886. In a short historical review, the honor of priority in the description of the disease is accorded to an American writer, Dr. James Jackson, who wrote of this affection as early as 1822. Dr. Jackson's clinical description is most true to nature, and Dreschfeld quotes from it at some length.

The author, according to the more prominent symptoms, divides the affection into two groups, the alcoholic ataxia and the alcoholic paralysis. In one there is marked incoördination with little or no paralysis, in the other there is decided paralysis, and the ataxia is in a measure dependent upon the paralysis. Dreschfeld considers the ataxic form as a far milder type, although

the pathological change is the same—a peripheral neuritis. He has observed three cases of this form, two of which recovered, whilst the third died from uræmia due to a contracted gouty kidney.

The paper embodies a report of three of these cases. In the first case there were no mental symptoms whatever, in the second the patient was irritable and lost his memory for recent events. The latter symptom was still present when Dreschfeld saw him a year after the onset of his illness. The mental condition of the third case is not stated. This was the one that proved fatal. At the autopsy the brain and cord were found normal. The sciatic nerve, which had been preserved for microscopical examination, showed a moniliform state of the nerve tubes due to breaking up of the myelin, the nuclei were increased, and there was also some interstitial cell infiltration. Transverse section showed, in some places, an increase in the diameter of the axis-cylinder, and some insterstitial infiltration. The muscles exhibited chiefly increase of the muscle nuclei and an interstitial deposit of small round cells, and in some places the striation was not well marked. The kidneys were found small and highly granular, and the heart greatly hypertrophied.

Four cases are reported of the second group in which the paralysis predominates over the ataxia. Considerable stress is laid on the mental condition in these cases, which, the author thinks, is quite characteristic. The patient's memory is usually very defective, and they are the subjects of a strange delusion. They are oblivious to the circumstance that they are confined to bed, and fancy they take long walks. One of Dreschfeld's patients said she went out every afternoon for a walk to the seaside, which was at least twenty miles from her residence. In three of the cases considerable atrophy accompanied the paralysis. In addition to the above, the patients suffered for the most part from the following symptoms: "lightning pains" in the extremities, muscular hyperæsthesia on firm pressure, anæsthesia of the skin, loss of the tendon reflexes, the superficial reflexes remaining normal. In only four of the patients was an examination made by electricity. This displayed with the galvanic current a greater or less degree of degenerative changes of the muscles. Nothing is said of the electric reaction of the nerves. Regarding the pathology of these cases, the author merely states that, in his opinion, it is a neuritis of the peripheral nerves.

Alcoholic paralysis formed recently the subject of one of LANCEREAUX'S clinical lectures (*L' Union Médicale*, July 14, 1885). A short and sketchy outline of the clinical aspect of the affection was given. He divided alcoholic paralysis into three forms according to its development. In the first form, the paralysis develops rapidly and progressively. It has a tendency to become general and prove fatal. The clinical features resemble those of subacute myelitis. In the second, the development is subacute, the paralysis has a tendency to retrocede and become cured. The third form pursues a very chronic course, and usually the inferior extremities only are affected. It commonly terminates in cure.

A case was presented exhibiting the characters belonging to the second form. A noteworthy feature of the case was that the paralysis affected, in the main, the extensors of the legs and arms. The paralysis was preceded for a long time by pricking sensations and shooting pains in the legs. At the time

of the patient's admission into the hospital, the tactile sensation was notably diminished, though there was hyperæsthesia of the anterior surface of the legs and upper surface of the forearms.

Lancereaux favors the view that the pathological change involves the peripheral nerves only. He has had several fatal cases; in all, the brain and cord were found normal, but the nerves showed the same change that a nerve does after section. He recommends the following treatment: chloral and opium during the restless stage; after the nervous system has been quieted, every endeavor should be made to tone the system. He puts great faith in hydrotherapy to accomplish this. Electricity he advises, on account of the atrophy, but does not think it has any influence upon the regeneration of the nerves.

Dr. Thomas Buzzard, in the Harveian Lectures of 1885, on the subject of some forms of paralysis dependent upon peripheral neuritis (*Lancet*, December 19, 1885), touches upon the question of alcohol, independent of gout, as being the cause in some cases of peripheral paralysis. He says: "Alcoholic cases are occasionally met with in which there is paralysis to a considerable extent, which has escaped the notice of the patient's friends. The patient (usually a female) lies in bed in such a muddled condition of mind that she does nothing for herself, and takes sustenance at the hands of others. When moved from side to side, in bed, or when her limbs are touched, she cries out with pain." He goes on to say that there is wasting of the extremities, the knee-jerks are absent, the faradic excitability in the muscles is greatly reduced or lost. The prognosis of these cases is somewhat doubtful, as in them the brain also is always more or less involved. But from personal experience, Buzzard is disposed to give a very favorable prognosis, even in cases that are marked by extensive paralysis and muscular atrophy.

Hemianopsia and the Visual Centre.

At the stated meeting of the New York Neurological Society of the 8th of October, 1885, Dr. E. C. Seguin read an important paper on the pathology of hemianopsia of central origin (*The Medical News*, Nov. 14, 1885). A brief synopsis was first given of the peripheral varieties. Lateral hemianopsia, or, as it is often called, homonymous hemianopsia, in which the nasal half of one visual field and the temporal half of the other are dark, so that with one or both eyes open the patient sees the same half of any object placed before him, results from a central lesion. The author analyzed the recorded observations of hemianopsia due to cerebral lesion, 42 in number, including the author's own cases; of these, 37 were medical and accompanied by autopsies, 5 were surgical and were followed by the survival of the patient. These relatively numerous observations were classified as follows: (a) Cases of lateral hemianopsia, 34 in number, indefinite or irrelevant, and useless for localization and study; (b) cases of lateral hemianopsia from lesions of parts of brain not directly related to the optic apparatus, 3 in number; (c) cases of lateral hemianopsia from lesions involving chiefly the thalamus opticus or corpus geniculatum laterale; (d) cases of lateral hemianopsia from lesions chiefly or exclusively involving the white substance of the occipital lobe; (e) cases of lateral hemianopsia of external or traumatic origin; (f) cases of lateral hemianopsia due to lesions involving the cortex of the brain and subjacent white substance.

Dr. Seguin considered the last category as being by far the most important for the study of the localization of the visual centre in man, and gave full abstracts of the recorded cases. The lesions in all were so placed as to cumulate toward the mesial aspect of the occipital lobe. By means of a shaded chart, the position of the lesion in the thirteen cases was represented. This was found to be upon the mesial aspect of the cerebrum, including the lower part of the cuneus and the fifth temporal gyrus. To this locality also was limited the lesion found in the following cases: Haab's, Huguenin's, Téré's, and Seguin's. These were single lesions, and no paralysis or anæsthesia had been observed during the patient's life—only hemianopsia.

Dr. Seguin's own case was as follows: A man, aged forty-six, affected with malignant endocarditis (mitral vegetations), which proved fatal in sixteen months from first observation in January, 1884, through repeated visceral embolism. The case also exhibited for many weeks prior to death an exquisite intermittent form of fever closely imitating malarial intermittent. About December, 1884, the patient suddenly complained of blindness of the left eye and slight numbness through the whole left side of the body. He strongly insisted then, and frequently thereafter, that his left eye was alone affected, because he could not see to his left. Examination showed well-defined left lateral hemianopsia, the vertical line passing a little to the left of the point of fixation. In a short time the numbness passed away, but the hemianopsia persisted until death. The patient was able to read and write easily for many months before death, in spite of the hemianopsia. The lesion found at the autopsy was a large old patch, of yellow softening, involving the greater part of the right cuneus, almost reaching the apex of the occipital lobe and the fifth and fourth temporal gyri, extending also into the gyrus hippocampus. This lesion was found to be a blockade of the occipital branch of the posterior cerebral artery. The white matter was involved to a depth of several millimetres. The process of hardening the brain for examination was unsuccessful in part, and only the occipital end of the brain became hard. The absence of decided motor and sensory symptoms during life, however, made it quite certain that there were no other gross lesions in the brain.

From these data and others, Dr. Seguin considered it as well proven that the visual centre in man is in the cuneus and adjacent gray matter below it. A destruction of this part of the hemisphere inevitably produces lateral hemianopsia of the field on the opposite side of the body. To explain the few cases in which the lesion causing hemianopsia is situated upon the lateral aspect of the hemisphere, in the inferior parietal lobule, and the gyrus angularis, one must remember the course of the optic fasciculus of Gratiolet and Wernicke on its way from the optic centres. This passes close under these gyri, and a lesion that penetrates at all beneath the gray matter of the cortex must intercept, by pressure or by destruction, the optic fibres. These are lesions intercepting communication between the eyes and the visual centre, while lesions of the mesial aspect of the occipital lobe destroy the centre itself.

Mental Symptoms in Uræmia.

In a critical review on uræmia Girandeau (*Archives Générales de Médecine*, January, 1886) gives an interesting account of the mental symptoms which

may develop in the course of chronic Bright's disease. This *folie brightique*, as Dieulafoy calls it, presents very diverse features. Sometimes it comes on as violent delirium or acute mania, with hallucinations of sight and hearing. In such cases the existence of renal disease may not have been suspected, and the symptoms come on suddenly. An instance of this kind came under our notice a few years ago, and is reported in Seguin's *Archives*, 1882. Sometimes the patient becomes melancholic, and meditates suicide and loses interest in the affairs of life. The idea of persecution may exist, the patient may fear poison and refuse to eat, more rarely it takes the form of religious or erotic mania. These forms may exist alone or follow each other, and occasionally are combined. The duration is variable; the acute delirium may be quickly succeeded by coma and death, but the condition may last in some cases for weeks or months, as in a patient we had an opportunity of seeing last year with Dr. Mullin, of Hamilton, Ontario, in whom the mental alienation persisted for over two months, and ended in complete recovery. The question has been considered in its relation to testamentary capacity by Dr. Stephen Rogers (*Medico-Legal Society of New York Papers*, Series ii., 1882).

Uræmic Epilepsy and Hemiplegia.

Chauternesse and Tenneson (*Revue de Médecine*, November, 1885) have made careful studies of local (Jacksonian) epilepsy and hemiplegia in Bright's disease which are of special interest, as they prove that these conditions may be induced by local œdemas of the brain. In four cases of hemiplegia which presented the usual characters of unilateral paralysis from hemorrhagic lesions, the autopsies showed only an intense serous infiltration. Of two cases of partial epilepsy one proved fatal, and the most careful search failed to demonstrate the existence of any local lesion other than the intense œdema.

Actinomycosis.

Dr. James Israel, to whom the profession is indebted for the first description of this disease in man, has published an important monograph (*Klinische Beiträge zur Kentniss der Actinomykose des Menschen*, Berlin, 1885) in which all the cases are carefully studied and arranged in groups, according to the supposed mode of entrance of the parasite. Thirty-eight cases are analyzed; a considerable material when we think that scarcely eight years have passed since the affection was first recognized.

Three groups of cases can be recognized according to the mode of entrance of the parasite, by the mouth and pharynx, by the air-passages, and through the intestines. In the first group, comprising seventeen cases, the disease was localized in the lower jaw, the submaxillary region, the neck, and retro-pharyngeal region about the cervical spine and base of the cranium. It seems probable that in all these cases, as in cattle, the disease originates in diseased teeth, as there was affection of these parts in fourteen or fifteen cases of this group, in which the condition of the teeth and jaws was noted. In an unreported case of Israel's, there was a central actinomycotic process in the lower jaw identical with the "big jaw" of cattle. In a few instances the disease appears to have begun on the tongue or tonsil, but it seems clear

that, in the majority of cases in which the mouth and neck are affected, the process begins by an invasion of the parasite in diseased teeth.

To the second group of cases, pulmonary actinomycosis, Israel makes the most valuable contributions, and we feel that he has added a new and formidable disease to the already long list of lung affections. Of nine cases, in one, that of Cantani, the process was limited to the bronchial mucous membrane. In the others the lung tissue was involved. The clinical picture is complex. The process is chronic, and may exist a year without severe symptoms. The sputum contains the yellow actinomycotic granules, and is so far characteristic. Peribronchitic and pneumonic changes are excited in the substance, and cavities ultimately form. The disease tends to extend to the pleura, excites empyema, involves the costal layer, and has, in many instances, caused necrosis of the ribs and external fistulæ. The prevertebral tissues become involved with caries of the spine. The peritoneum may be affected through the diaphragm, and the mediastinum and heart have been involved in some cases. In addition to this direct extension in pulmonary actinomycosis, there have been, in these cases particularly, numerous metastases which impart to them the clinical aspect of a chronic pyæmia. Skin, muscle, heart, liver, intestines, and brain, have been found the seat of actinomycotic abscesses. The course of the disease has ranged in the cases from five to twenty months.

In the third group the disease begins in the intestinal tract. It may be, as in Chiari's case, superficial and confined to the mucosa, producing large, flat plaques, but more commonly it starts in the substance as nodular actinomycotic growths, which suppurate and induce ulceration. The ulcers may be most extensive, and the process may extend to the serosa. By adhesions taking place between the coils and perforation of the ulcers, a series of communicating abscesses may be formed. The peritoneum has been found extensively involved, and the pus may penetrate externally, or burrow in the retroperitoneum.

In a fourth group are placed five cases in which the mode of entrance of the parasite remains doubtful. Four of these there were prevertebral abscesses, and in the fifth there was an actinomycotic abscess in the right Fallopian tube.

SURGERY.

In Europe.

UNDER THE CHARGE OF

FREDERICK TREVES, F.R.C.S.,

SURGEON TO, AND LECTURER ON ANATOMY AT, THE LONDON HOSPITAL.

Recent Surgical Literature.

The last-issued parts of the *Dictionnaire Encyclopédique des Sciences Médicales* consist of three volumes. In the first of these ("Ebe to Eco") the only articles of surgical interest are "Ecchymose," by A. Dechambre, and "Écoles," by Alexandre Layet. The former is a contribution of no note. It contains

nothing new, and cannot even be said to represent the knowledge furnished by the literature of the day. The latter article is an elaborate and most valuable monograph, and forms an exhaustive treatise upon school hygiene. The question of school desks and school seats is fully considered, and the subject of lateral curvature of the spine is entered into at some length—indeed, this portion of the article forms an important contribution to the etiology of lateral curvature. The effects of posture upon the sight, and the defects of vision that appear to be incident to school-life, occupy some space. The second of the volumes ("Eco to Egu") is occupied mainly by the articles "Eczéma" and "Égouts." The only monograph of surgical interest is that on "Écrasement," by André Boursier. The paper is well written, although somewhat verbose, and is probably the most complete treatise upon the écraseur and its uses that any literature possesses. It concludes with an excellent bibliography. The various instruments are described, and many are figured. The mechanical effects of "écrasement" upon the tissues is dealt with at some length, and the article contains much original matter. It is pointed out that, as regards the arteries, the external coat is greatly elongated and is drawn out into a thin thread, while the internal and middle coats are divided abruptly, and become turned in, so as to occlude the lumen of the vessel. The various accidents that may attend the use of the écraseur are dealt with, and a great deal of space is taken up with the indications and contraindications for its use.

LÖBKER'S work on *Operative Surgery* (*Chirurgische Operationslehre*, Wien, 1885) is now complete. It is intended to illustrate a course of operative surgery as practised upon the dead body. It is one of the best and most concise manuals of its kind. The descriptions are brief and practical, and the anatomical details of the various operations are fully discussed. The illustrations are numerous and of a high order. In addition to the operations that are usually dealt with in a practical course upon the cadaver, Löbker describes a number of operations that could hardly become a part of such a course. Such are the radical cure of hydrocele and of hernia, plastic operations, and the like. The descriptions given of these procedures are so very brief that they must prove to be of doubtful value.

Volume 3 of POULET and BOUSQUET'S *Traité de Pathologie Externe* (Paris, 1885) has appeared, and deals with the abdomen, the genito-urinary organs, and in part with the limbs. This volume maintains the character of the preceding part of the work. It is a compilation merely, but at the same time a very good and useful compilation. The authors make more use of German and English material than is usual among French writers on medicine. The pathological and clinical sections of the book are very good, while the sections that deal with treatment are equally bad. Indeed, so little space is devoted to the question of treatment that it is a pity that the whole subject had not been omitted. In many departments, such as that dealing with the radical cure of hernia, the authors are far behind the time in therapeutics.

NEW WOUND DRESSINGS.

PROF. JOHN WOOD (*Brit. Med. Journal*, Dec. 12 and 19, 1885) reviewed, in his Bradshawe Lectures, the use of antiseptics, and stated that he had obtained

good results with dilute solutions of peroxide of hydrogen and nitrate of silver. The former is of course an unstable compound, and if used for wounds should be protected by gutta-percha tissue, or mixed with some mineral antiseptic. It has the advantage of being perfectly innocuous.

Since May, 1883, PROF. FISCHER (*Zeitschrift für Chir.*, xxii. Hefte 3 und 4) has employed powdered sugar (itself a feeble antiseptic) in combination with corrosive sublimate as a dressing, also using the carbolic spray and sublimate solution for certain operations. Stomatitis was frequently seen as a result, and one case of fatal hemorrhagic nephritis occurred. The urine in most cases was somewhat red, fluorescent, and contained altered urobilin. The powder can be left on the surface of the wound for many days, and Fischer values it highly as favoring primary union and preventing infection from without.

Bisulphide of carbon in dilute aqueous solution has been lately recommended by several (including M. Pasteur) as an efficient and safe antiseptic.

DR. SCHELLER (*Deutsche Zeitsch. f. Zahnheilkunde*, 1885, Heft 5) has found it useful in dental surgery, and in checking suppuration in the mouth and nose.

DR. GALEZOWSKI (*Lancet*, Jan. 2, 1886) employs thin gelatine plaster impregnated with a minute quantity of sublimate and of cocaine, to secure primary union in incisions made in the eye (cataract extractions, etc.). He holds that the normal tears contain microbes, and has even successfully operated for cataract complicated by dacryocystitis with the aid of the protective plaster.

TUBERCULAR INFECTION OF WOUNDS.

PROF. KRASKE (*Centralblatt*, Nov. 21, 1885) deals with this novel subject in a valuable communication. König, in 1882, recorded a case in which there was reason to suspect tubercular infection of a wound made for osteotomy of one tibia. The granulations became swollen and unhealthy, and at the boy's death, three months later, the autopsy showed tubercular changes in the bone and inguinal glands, as well as miliary tubercle in the liver, lungs, etc. This case, however, as König admitted, is open to another explanation. Both of Kraske's patients were boys, aged about ten years, in each case with a strong family history of phthisis; both were the subjects of what the author regarded as acute osteomyelitis of one femur, leading respectively to caries and to necrosis of part of the bone. The first case was discharged with a granulating wound, and whilst at home lived in the same room as his phthisical sister. Six months later he returned with three unhealthy sinuses, the granulations of which showed giant cells and a few undoubted tubercle bacilli. After treatment by erosion and the use of iodoform the sinuses considerably improved.

In the other case the pus from the first abscess was found to contain only micrococci; but after spontaneous fracture of the affected femur and degeneration of one of the sinuses, tubercle bacilli were found in its walls (though only in the part nearest to the skin).

Kraske points out that tubercular infection, although undoubtedly rare in wounds, must frequently occur through the surface of the skin and mucous membranes. He instances tubercular ulcers of the rectum, larynx, and tongue in cases of phthisis, and tubercular glands resulting from scrofulous eczema and

lupus. In two examples of the so-called necrogenic lupus on the hand, tubercle bacilli have been found, and the author excised cheesy axillary glands from one of his colleagues, who was convinced he owed them to infection through the finger during an operation for tubercular bone disease.

Kraske believes that such a depressing disease as osteomyelitis may predispose to the admission of tubercle germs, as is admitted in the case of measles and of whooping-cough.

In the *Revue de Chirurgie* (1885, No. 8) the result of an examination into the nature of hygromas containing "melon-seed bodies" is recorded by MM. NICAISE, POULET, and VAILLARD. It confirms the view that they are tubercular, the bacilli being readily found in their walls. The four cases investigated included one cyst which had formed in the region of the tensor fasciæ femoris after a wound, the other three being seated in the fingers. The authors hold that the curious contents are due not to fibrin coagulation, but to a sort of necrosis of the lining membrane.

DR. MENDELSOHN (*Zeitschrift für klin. Med.*, 1885, p. 108) mentions eight cases in which phthisis rapidly developed after a severe contusion of the chest. He believes that some injured part of the lung formed a nidus for the bacilli to develop in, especially since the pain caused the patients to keep the affected part at rest. There was no evidence of hereditary tendency to phthisis in seven of the eight cases. Mendelsohn suggests that patients suffering from this injury should be carefully guarded from exposure to a bacillus-bearing atmosphere.

OPERATIONS ON THE CLAVICLE.

PROFESSOR KRÖNLEIN (*Inaug. Diss.*, Zurich, 1885) has added one more to the list of about twenty cases of total extirpation of the clavicle for tumor. His patient was a girl aged seventeen, and the growth, in about two months, had reached the size of a man's fist. During the operation the pleura was wounded, and secured with catgut. In three weeks the wound had healed and the patient recovered good use of the arm, but unfortunately suffered a return of the disease within five months.

KRÖNLEIN has also resected a large mass of callus from a case of fractured clavicle, the limb being quite crippled owing to its pressure on the vessels and brachial plexus. No improvement in function followed the operation at the end of a year.

MR. WHEELER, of Dublin (*Trans. Acad. Med.*, 1885, p. 172), records a more favorable issue to a similar operation performed by him in 1874 on a man aged forty-three. When seen ten years later, the patient was well, able to work, and the loss of the bone could hardly be detected so far as power of the arm was concerned. Unfortunately, no account of the nature of the primary tumor is given.

MR. BARKER (*Lancet*, January 30, 1886) resected the false joint remaining after a fracture of the clavicle (sustained in utero?) on a boy aged twelve, who presented symptoms resembling somewhat those of "writers' cramp." The fragments were wired together, the wound healed at once under antiseptics, perfect immobility of the arm ensued, and the symptoms entirely disappeared.

The Treatment of Sterno-clavicular Dislocations.

M. Le Fort (*Gaz. des Hôpitaux*, 1885, No. 47) deals in this paper with two cases of dislocation forward of the sternal end of the clavicle. He points out that in this luxation the end of the bone can be replaced very readily by direct pressure, but that it is only with considerable difficulty that it can be retained in position. With reference to this point, it may be said that M. Le Fort appears to exaggerate the evils that attend non-reduction. It is well known that the function of the upper limb may be perfectly recovered after an unreduced dislocation of the clavicle forward. M. Le Fort, after pointing out the defects in the methods usually adopted in France for the treatment of this injury, advocates the following apparatus: The clavicle having been replaced, a large sheet of gutta-percha is taken, and, while warm, is carefully moulded over the two sterno-clavicular joints, over the inner two-thirds of the clavicle on the injured side, over the lower half of the neck and the upper half of the thorax. This splint is then fixed in position by a starch bandage, and the apparatus is not removed until the end of five weeks. In the two cases cited the treatment answered admirably, and the displaced bone was perfectly retained.

Congenital Dislocation of the Hip-joint.

Mr. William Adams (*British Med. Journ.*, Nov. 7, 1885, p. 859) gives the following details of 60 examples of this deformity that have come under his notice:

Out of the 60 cases, 13 occurred in males and 47 in females. In 19 cases both hip-joints were affected, and in 41 only one hip-joint; and of these, the right joint was affected in 15 cases and the left in 26 cases. The labor, whether natural or otherwise, is noted in 45 cases, in 23 of which the labor is said to have been easy and natural, and in these cases we may fairly assume that the head presentation occurred. Breech presentation occurred in 7 cases, and prolonged labor in 22 cases. The malformation is not more often met with in first children than in other than the first born. In one instance the patient was the eighth child. Hereditary predisposition is stated to have existed in only one instance, and in that case, a girl aged six and a half years, the father and the father's sister are both said to have had congenital dislocation of one hip-joint. With regard to age, nearly all the cases have been between the ages of two and six years when they came under notice. "With regard to the general history and symptoms of this affection, it is well known that there are no symptoms whatever to direct the attention of the accoucheur to the condition of the hip-joint at the period of birth; no malposition of the limb, or immobility; on the contrary, the movements are free in all directions. As a rule, no attention is drawn to the hip-joint until after the period of walking, which is sometimes a little later than in other children, especially when both hip-joints are affected; then, if one hip-joint be affected, the child walks with a limp, and a suspicion of hip-joint disease is naturally raised, and in several instances I have known these cases treated for hip-joint disease. When both hips are affected the child walks with an awkward waddling gait, which, it is thought, it will grow out of; but as these conditions do not disappear, other opinions are taken." At about three years

of age the diagnosis becomes easy, and as age advances—say from ten to twenty—all the diagnostic symptoms become exaggerated.

Mr. Adams points out that, in the specimens so far examined, the acetabulum is either completely absent or represented by an exceedingly imperfect socket. Great alterations are observed in the size, shape, and attachments of the capsular ligament. The head of the femur is wasted, flattened, and irregular in shape, but still covered with some articular cartilage.

Mr. Adams opposes the theory that the deformity is due to spasmodic muscular action *in utero*, and maintains that the pathology is in no way identical with that of clubfoot. He also strongly opposes the view that the deformity is due to a dislocation of traumatic origin, resulting from violence inflicted during labor. Indeed, he is of opinion that the condition is not á dislocation at all, in the true sense, but that it is a displacement of the head of the femur resulting from malformation of the acetabulum. It is no question of the femur having slipped from the acetabular socket, since the evidence points to the probability that such socket never existed.

The Wire Suture in Cases of Fractured Patella.

If this operation has been widely adopted, operators have not lately contributed much to its statistics. Mr. Hardie, of Manchester (*Brit. Med. Journal*, November 28, 1885), obtained good results in each of four recent fractures of the patella treated by suture with Listerian precautions, the patients being able to flex the affected bones to an acute angle at the end of four months. He advocated it as a routine method of treatment—a rather premature suggestion in the light of such (by no means infrequent) disasters as have been recorded. In M. Chauvel's report to the Société de Chirurgie (November, 1883), 49 cases were mentioned, with 35 successes, 3 deaths, 1 secondary amputation, and 10 failures. This formidable list is increased by a case of M. Le Bec's (*Gaz. des Hôpitaux*, January 14, 1886). This surgeon was led to operate on a man, aged forty-nine, whose left leg was helpless owing to a fracture of the patella sustained eight weeks before. It was thought that the joint was not opened, owing to a new membrane which had formed below and between the fragments. Antiseptics (sublimate solution and iodoform) were freely used, but suppuration followed around and in the joint, the two silver sutures gave way, in moving the limb the patient made the transverse wound gape widely, and he died from exhaustion a month after the operation. No full autopsy was allowed, but there were no marked evidences of pyæmia. A similar disastrous result (free suppuration and death of the patient) followed in a case reported in the *Lancet* of December 12, 1885.

Caries of the Cervical Spine.

Mr. Edmund Owen (*British Medical Journal*, Oct. 31, 1885) has furnished an important practical paper upon this subject. It is founded upon several cases that are selected as serving to illustrate the principal features in the clinical aspects of the disease. The following is an abstract of Mr. Owen's observations:

Disease of the high cervical spine urgently demands early diagnosis and

prompt treatment, but unfortunately the first symptoms of the mischief are not unequivocal, and are apt to be interpreted as of "rheumatic" origin.

There may be pains, possibly called "headache," over the area of the greater and lesser occipital nerves, both of which come from the second cervical nerve; or in that of the great auricular from the second and third; the third nerve joins in the formation of the transverse superficial cervical nerve, which supplies the skin over the front of the neck. The pains will be worse after play or exercise, and the child will not bear pressure on the top of, nor will it shake or turn the head. Young children are not clever at describing symptoms, and a headache "somewhere here" is apt to be the result of irritation of high cervical nerves. If the disease be lower in the neck, pain may be referred to the pectoral or deltoid regions, where the supraclavicular branches are distributed.

If the lowest cervical vertebræ be inflamed, the nerve-trunks which enter into the brachial plexus will be liable to compression, pain being referred to the shoulders, elbows, or even to the fingers. For pains in each shoulder or each arm, the cervical spine should straightway be examined. And even if obscure pains be not symmetrical, but confined to one side, attention should be directed to the spine.

Mr. Owen has made an extensive trial of Sayre's jury-mast, but has been compelled to discard its use entirely. In its place he employs a leather collar and cuirass. The apparatus is made by moulding the leather after immersion in hot water. The cuirass is composed of a breastplate and a back piece, and serves to give a secure basis to the collar. The collar is so arranged that both the chin and the occiput are steadily supported, and the cervical spine is thus kept erect and in a fixed position.

Mr. W. J. Walsham (*British Medical Journal*, Oct. 31, 1885) proposes and has employed a somewhat similar appliance for caries of the upper dorsal and lower cervical regions of the spine. The apparatus, which is made out of one piece of felt, consists of an ordinary poroplastic felt jacket, together with an accurately fitting collar and helmet-piece. The jacket and collar are continuous posteriorly; the collar portion is carried upward over the occiput, and after encircling the neck is bent downward over the shoulders and upper part of the front of the chest, where it overlaps the jacket portion, and is there secured in position by straps and buckles. The head is kept in position within the helmet-piece by means of a strap that passes round the forehead.

Causes of Failure in Excision of the Hip.

Mr. Cowell (*Westminster Hospital Reports*, 1885) strongly advocates excision in severe cases of hip disease. The disease must be in the last stage, there must be grating between the bones, and the articulation must be quite disorganized. It is particularly indicated in cases attended by profuse suppuration, and by failing health. He has performed the operation in sixty-five cases. He discusses the causes of possible failure under the following heads:

1. Undue postponement of the operation is serious, especially if the patient is beginning to exhibit evidences of visceral tuberculosis.

2. The younger the patient the more successful the operation. The operation should never be performed in patients over fourteen or sixteen years of

age. The best results are obtained in patients between the ages of three and six.

3. The diseased tissues—to insure success—must be *entirely* removed.

4. Failure often depends upon imperfect drainage of the wound, with subsequent burrowing of pus.

5. Failure may attend a neglect of the position of the limb after operation, and especially the too early discontinuance of extension.

6. The surroundings of the patient must be healthy.

Thrombosis.

Eberth and Schimmelbusch have published an important monograph upon this subject (*Fortschritte der Med.*, Bd. iii., 1885, No. 12). Their conclusions are founded upon a series of experiments made upon the mesenteric vessels of warm-blooded animals. They first of all describe the normal blood stream. There is the central or axial current in the middle of the vessel where the stream is the most rapid, and where red disks alone (or practically alone) are found, and there is the peripheral current where the stream is slow and where the leucocytes congregate, and are to be seen rolling slowly along by the vessel wall. As the stream in the vessel is rendered slower, the leucocytes collect in the peripheral current and appear more numerous. When the blood stream is rendered very slow, the red corpuscles are found in increasing numbers in the peripheral part of the current, while the leucocytes are diminishing apparently by emigration. One degree further, and the whole mass of the blood in the vessel stagnates.

The authors, in the next place, oppose the usual theory of thrombosis. They maintain that it is not to be produced by a lesion of the vessel alone, nor by contact of the blood with an intima that is in abnormal condition. These circumstances are factors in the production of thrombosis, but they alone are not sufficient. They maintain, moreover, that the process is not one of coagulation, and that the blood does not coagulate in the vessel as it coagulates when it has escaped from the body.

The process is as follows: Two conditions must exist—a disturbance of the circulation, and an abnormal state of the intima. Neither of these factors is by itself sufficient. They must coexist. The blood current in the vessel is slowed; the axial current ceases to be evident; the red corpuscles enter the peripheral stream and come in contact with the vessel wall; they here undergo a change that is termed "*viscöse.*" From this change it results that they not only adhere together, but they also adhere to the tunica intima. Thus the thrombus is produced.

There is in the first stage, at least, no formation or production of fibrin. The authors support their conclusions by clinical and anatomical facts relating to thrombosis, and especially point out that it is most often met with in vessels in which the stream is slow.

Mycosis Fungoides.

Rindfleisch (*Deutsche med. Wochenschrift*, 1885, No. 15) gives an elaborate account of the anatomy of this remarkable disease. In a typical case he had an opportunity of examining not only the nodules in the skin, but also the viscera and some secondary deposits in the lungs.

This little known disease has been described by Kaposi under the name of sarcomatosis generalis, by Vidal and others as lymphadéme cutanée, and by Auspitz as granuloma fungoides. Its main feature is the appearance of numerous successive nodules on the skin. These nodules are spongy, and after a certain period of growth break down. After a period of months or years fever sets in, and the patient dies of exhaustion.

Rindfleisch found this disease to be distinctly a dermatomycosis. He found in the capillaries about the nodule plugs, which, on further examination, proved to be colonies of a minute streptococcus. To this bacterium the disease is evidently due. Like colonies were found in the secondary deposits in the lungs. The name given to this remarkable malady by Rindfleisch would appear, therefore, to be the most appropriate of the many with which it is burdened.

A Case of Chylothorax due to Rupture of the Thoracic Duct.

This very interesting and remarkable case is reported by Dr. Krabbel, in *Centralblatt für Chirurgie*, Oct. 17, 1885. The patient, a lad aged sixteen, was admitted into hospital on August 31st. He was engaged in a mine, and while pushing a train of trucks along the rails toward the shaft, he was met by another train coming in the opposite direction, and upon another line of rails. He was in the space between the two lines, and this space was too narrow to allow a man to stand when both of the lines were occupied by trucks. He was struck upon the left side by the advancing wagon, and thrown upon his back, across the rails. While in this position, one of the empty trucks that he had been pushing passed across his chest from left to right. On admission, he did not seem to be severely hurt. No fractures could be detected, nor was there much bruising. He complained of some tenderness over his back, but he retained perfect power in all his limbs. There was neither emphysema, nor cough, nor hæmoptysis, nor dyspnœa. Pain was felt over the chest. An examination of the left side of the thorax revealed a perfectly normal condition, but there was some dulness over the lower part of the right pleural cavity, and here the breath-sounds were lost. The case was diagnosed to be one of hæmothorax. The lad did well for three days. There was no fever, no dyspnœa, no symptom to cause alarm. The dulness, however, on the right side increased. On the fourth day, he began to suffer from dyspnœa, and lay upon his right side. On the fifth day, he complained of terrible oppression in the chest and great difficulty in breathing. The whole of the right side was now quite dull, and over this area no breath-sounds could be heard. He became cyanosed, and collapsed, and died on the same day with all the phenomena of apnœa. At the post-mortem the liver was found much pressed down into the abdomen. The right pleural cavity contained a gallon and a half of a whitish, milky, odorless fluid, which proved to be pure chyle. There was no admixture of either pus or blood. No pleurisy existed, except quite at the lower part of the cavity. The right lung was quite collapsed, but uninjured. All the other viscera were sound. The body of the ninth dorsal vertebra was found broken right across. There was no displacement, and the fracture looked more like a saw-cut. The meninges and cord were perfectly sound. It was just above the line of the fracture that the thoracic duct was found to be entirely torn across.

Treatment of Empyema.

Mr. R. J. Godlee (*Lancet*, January, 1886) reviews the whole subject in two interesting lectures. He points out how much the age of the patient influences the prognosis, children both recovering from the various operations and disposing of residues of pus more easily than do adults, and he records several cases amongst the former in which a single aspiration effected a permanent cure. If, however, aspiration has been employed several times without success, he advocates freely opening the cavity a little below and outside the lower angle of the scapula, at the same time excising part of the eighth or ninth rib. Sometimes the pyogenic membrane is scraped away, at other times iodine solution is injected, but the occasional danger of both measures hinders their being considered always advisable. The use of iodoform or other antiseptics is strongly urged. Mr. Godlee has already performed Estlander's operation, and prefers to remove the thickened periosteum as well as the ribs, the danger of hemorrhage from the intercostal vessels being insignificant. In one case, parts measuring two inches each were removed from five ribs, with a good result.

In children, an attempt to dispense with drainage may be made much sooner than in adults, in whom the tube should be worn as long as pus continues to discharge. Patients with chronic phthisis and empyema should not be operated on unless the latter condition is causing much inconvenience; the same applies to cases in which the cavity is quietly discharging its contents through the bronchi.

Dr. Fischer, of Strassburg (*Centralbl. f. Chir.*, November 28, 1885), advises that the opening should be made in the seventh or eighth intercostal space in the line of the scapula (in this practically agreeing with Mr. Godlee), and invariably excises part of a rib at the same time. He employs injections (by preference one containing chloride of zinc) only if the pus is foul, and uses wood-wool as a dressing. Resection of several ribs is only justifiable when the patient has been allowed to get about for some time, and the cavity shows no signs of closing.

In a record of forty cases Cormack (*Thèse de Paris*, 1885) gives ten fatal results of Estlander's operation, and the same number of complete cures. The procedure is best undertaken after an interval of from six to twelve months from the formation of the fistula. A very large cavity, extensive tuberculosis, and communication with a bronchus are contraindications.

Dr. Maclaren (*British Med. Journal*, January 23, 1886) successfully removed parts of six ribs in a boy aged eighteen, and suggests that the cartilages may also be divided in cases in which much diminution of the cavity is aimed at.

Rose, of Berlin, has lately excised parts of eight ribs from a patient with empyema, with a successful result.

Gastrostomy.

Prof. Zesas (*Archiv für klin. Chir.*, xxxii. Heft 1, S. 188) treats at great length the statistics of this operation. He includes 162 cases, 129 of carcinoma, 31 of non-cancerous stricture of the œsophagus, and 2 of syphilitic ulceration. Before antiseptics came into use the operation was almost invariably fatal,

while since that time about one in every four cases have survived for a time. The author favors the oblique incision (parallel to the thoracic edge), and secures the peritoneal and serous coats first to the wound, subsequently suturing the mucous membrane to the skin. He deprecates dividing the operation into two stages, since by deferring the final opening of the stomach the patient may die of starvation before the wounded surfaces have adhered. Local anæsthesia is recommended to prevent vomiting.

M. COHEN (*De la Gastrostomie*, etc., Paris, 1885) discusses the operation with regard to non-cancerous stricture. He agrees with Zesas in recommending immediate opening of the stomach, although the statistics of the operation in two stages are the most favorable (seventeen recoveries out of twenty-four cases, as opposed to seven out of twenty). He attaches importance to sudden onset of severe thirst as an indication for gastrostomy in cases of stricture. A careful analysis of the cases hitherto recorded is given.

MR. KNOWSLEY THORNTON (*Lancet*, January 9, 1886) records the second successful gastrostomy for the removal of a mass of hair (the first being performed by Schönborn, see Langenbeck's *Archiv*, 1883, p. 609). His patient was a girl aged eighteen, who had for some years been addicted to swallowing hair. The passage of a fecal concretion containing hair threw light on the nature of the abdominal tumor. A median incision having been made, the great curvature was opened and a mass weighing two pounds easily removed, exposing a healthy mucous membrane. Thirty carbolized silk sutures were used for the stomach, fifteen of them passing only through the peritoneum, the closed wound measuring three inches. Antiseptics were used throughout. Next day, on account of vomiting and epigastric pain, the external wound was reopened and a missing sponge extracted. At the end of forty-eight hours the patient was allowed iced milk in small quantities, after a fortnight corn flour was added to this diet. Nutrient enemata were given every three hours during the first week.

The recovery was complicated by the formation of an abscess in the right parotid, temporary attacks of polyuria (probably hysterical), and occasional elevation of temperature; but she left the hospital at the end of four weeks, and has remained well during the two years that have since elapsed.

Mr. Thornton appends a notice of previous examples of this curious foreign body in the stomach, at the end of his valuable and detailed account of a most successful case.

GASTRO-ENTEROSTOMY.

The operation was performed by DR. RYDYGIER (*Przeglad lekarski*, 1885, No. 6) in a man aged thirty-two, who was suffering from cicatricial stenosis of the pylorus. Symptoms had existed for twelve months. There was hæmatemesis, and the patient had passed bloody stools. No tumor could be detected. Laparotomy was performed on July 26. The pylorus was found firmly fixed by adhesions to the liver and gall-bladder. As resection could not be carried out, openings were made in the stomach and in a loop of the upper intestine, and a permanent fistula established between these two parts by means of careful suturing. The operation was first devised and carried out with success by Wölfler in a case of carcinoma. The patient did well, and left the hospital in thirty-seven days.

Hernia.

Mr. R. J. Godlee (*Med. Times and Gazette*, Oct. 3, 1885) reports two cases of successful herniotomy in infants (five and six weeks old). He has seen two other cases of strangulated inguinal hernia at about this age; in all, the testicle was swollen, and subsequently became inflamed. Although possibly the intestine might have been reduced by further efforts at taxis in one or more of the cases, he advocates operating in order to suture the external ring.

Dr. Wiesmann (*Korrespondenzblatt für schweizer Aerzte*, No. 17, 1885) records an instance of properitoneal hernia in the inguinal region of a man aged seventy. He had kept the rupture up thirty years with a truss, and had suffered from strangulation symptoms for two days. Taxis failing, a small sac was opened and its contents found to be a much congested Meckel's diverticulum. It was further discovered that the sac led into a large one between the abdominal wall and the peritoneum. This was also opened, and a fibrous ring divided. Whether a second strangulation existed or not, was not certain. Peritonitis had already set in, and the patient died three days later.

From the description, it seems most likely that the case was one of reduction *en masse*.

Mr. Spanton (*Lancet*, Jan. 2, 1886) removed a hard fibrous tumor from the right spermatic cord of a boy aged fifteen, it having produced the symptoms of a strangulated omental hernia. Inflammation and even sloughing of the scrotum had been produced by its pressure, and the testis was excised at the same time. The wound rapidly healed. The tumor, which was the size of a large pigeon's egg, had been reducible.

Mr. A. E. Barker (*Brit. Med. Journal*, Dec. 12, 1885) has performed the operation for radical cure of umbilical hernia on two cases, both women between forty and fifty. Carbolic gauze dressings and the spray were used in each, the omentum being excised, and the ring closed by silk sutures, the sac and redundant skin having been cut away. Both operations were not incidents in that for strangulated hernia, but were performed with the direct object of a radical cure. Such cure, up to the last report (seven and three months afterward), appeared to have been obtained. An attack of pneumonia complicated the recovery in the second case.

Intussusception.

Dr. v. Basch (*Wiener Med. Blätter*, 1885, No. 7) holds, from experiments on the rectum, that the intestinal wall (the longitudinal muscular fibres) can, under certain circumstances, actively dilate the bowel, and thus produce an aspiratory effect. Owing to the pressure within that part being thus lowered, the mucous membrane above may be drawn down, and thus produce intussusception.

It is well known that intestinal polypi are sometimes the cause of this lesion, and in dissecting a fatal case, Prof. Heller, of Kiel, discovered that an inverted diverticulum had acted in the same way.

The Operative Treatment of Cancer of the Rectum.

Dr. Voigt has published an elaborate paper upon this subject (*Inaug. Diss.*, Halle, 1885). His report deals with eighteen cases of excision of the rectum

performed by Prof. Genzmer, according to Bardenheuer's method. Of this number, one patient died of shock, two of septicæmia, one of exhaustion at the end of three months, one at the end of sixteen days from embolism, after apparent recovery, and one at the end of four months, of the effects of urinary infiltration, the urethra having been removed in part with the rectum. In all the remaining patients a good immediate recovery followed, and in no instance has there been, so far, any local recurrence of the disease. The great majority of the operations, however, have been but recently performed. The last recent operations date from three years (two cases), two years, and one and a quarter years before the publication of the monograph.

Two patients died at the end, respectively, of seven and ten months of secondary deposits in the liver.

In eight of the cases the peritoneum was opened, and in two instances the vagina, and in one instance the urethra was removed in part with the new growth.

The author speaks in enthusiastic terms of the operation, and goes so far as to advise its adoption as a palliative measure, even in cases in which the glands have become involved, and the tissues about the bowel have become infected. He enters into elaborate detail concerning the steps of the operation. He advises that the coccyx should always be left when possible. It supports the parts, and greatly assists proper drainage. All the room that is needed in most cases can be obtained by continuing the incision backward to the sacrum on either side of the coccyx. In cases of high disease the sound segment of rectum between the growth and the anus should be removed. Dr. Voigt holds that there is no objection to the opening of the peritoneum. Indeed, he points out that the more of the rectum that is cut away, the wider is the segment of the meso-rectum that is reached, and the easier can the gut be drawn down and fixed to the skin. He states that from three to five inches of the bowel can be cut away without opening the peritoneum. He makes use of free drainage and frequent irrigation with solutions of chloride of zinc or corrosive sublimate.

Resection of Portions of the Bladder.

Some months ago Dr. Znamensky published in *Archiv für klin. Chirurgie*, Bd. xxxi. Heft 1, an interesting account of a series of experiments upon animals, in which portions of the bladder were removed. He operated upon dogs and removed considerable portions of the bladder-wall, with results that may be called successful. The wound left by the resection was carefully closed by means of sutures applied in a double row. All the operations were suprapubic, and concerned the summit and anterior wall of the viscus. No attempts were made upon the fundus of the bladder.

Dr. Antal has gone a step further, and in *Centralb. für Chirurgie*, Sept. 5, 1885, publishes an account of a case in which a part of the bladder of a man, aged sixty-one, was removed for epithelioma. The patient made a good recovery. The author commences his paper by referring to nine cases in which vesical tumors were removed by a suprapubic operation, but it would appear that in none of these instances was any part of the bladder wall excised. The only published case of resection of any part of the bladder previous to Antal's case, is placed to the credit of Sonnenburg. This surgeon removed

the upper two-thirds of the bladder, together with the peritoneum over it, and then closed the entire wound. The patient died in six weeks of exhaustion. Antal's operation was extraperitoneal. The patient had presented symptoms of vesical tumor for two years, and had suffered from hæmaturia for one year. He was much emaciated. The tumor was diagnosed at the vertex of the bladder. The viscus was movable, and no enlarged glands could be detected. The operation was performed on April 23, 1885. After the bladder had been well washed out with an antiseptic solution, the abdominal wall was incised above the pubes, and the space between the peritoneum and the symphysis opened up. The peritoneum was then carefully stripped from the bladder. An incision was now made into the viscus, and on introducing the finger a tumor the size of a child's fist was detected. The tumor, together with the part of the bladder from which it grew, was then removed. This involved the excision of about one-third of the entire organ. Seven vessels required ligature. The vesical wound was closed. A drain was introduced and allowed to project from the abdominal wound. The suprapubic fistula closed on June 17th, and the patient made a good and speedy recovery. He is able to hold his water for three or four hours.

Suprapubic Lithotomy.

Sir H. Thompson (*Lancet*, Dec. 5, 1885), during the last two years, has performed this operation seven times, with one death (a feeble patient aged seventy, the stone weighing only one and three-quarters ounces), and has also removed a large fibro-papilloma by the same method. He invariably first raises the bladder by distending the rectum (using the India-rubber bag introduced by Garson, of London, and Petersen, of Kiel). The bladder is also partly filled with some eight ounces of an antiseptic fluid. The knife is only required for division of the skin, linea alba, transversalis fascia, and the vesical wall; the other structures are traversed with the aid of the finger-nail or a special ivory instrument in its place. No deep sutures are used, and only one vessel required a ligature in all the eight operations.

The results are so brilliant that the suprapubic operation will probably receive an impetus from this publication. Sir H. Thompson advocates its use for all hard stones weighing two ounces and upward. He has lately published a short monograph on the operation.

On the Continent many cases have lately been recorded. Dr. Orlowski (*Centralbl.*, 1885, No. 51) successfully operated on three patients, aged respectively seventy, eighty-three, and sixty-four years. In one case he removed a bougie from the bladder, in another a large calculus from behind the prostate, and in the third several stones which had formed subsequent to a lithotripsy done one and a half years before. He advocates suturing the outer coats of the bladder-wall as diminishing the risk of urine infiltration and hastening the recovery, whilst admitting that immediate union cannot be thus secured. It should be said that one of his cases succumbed to pneumonia three weeks after the operation, but the wound had remained healthy.

A discussion at the Society of German Surgeons took place in Strassburg, September, 1885 (*Centralbl.*, No. 48, p. 849), in which Kraske reported a successful removal of a large phosphatic calculus by the suprapubic method, and Lücke a similar case, in which he was obliged to break up the stone with

chisel and mallet, the patient recovering. Prof. Czerny, of Heidelberg, had also performed the operation with good results; he did not employ distention of the rectum, since it added to the difficulty after the bladder was once opened, but advised deep sutures, unless the vesical wall had been bruised during the extraction.

In the latter opinion there seems to be a general concurrence amongst foreign surgeons.

Dr. Morison, of Newcastle (*Lancet*, January 9, 1886), removed a stone weighing nearly twenty-three ounces, from above the pubes, a pair of midwifery forceps being used to extract it. The patient died suddenly on the fourteenth day.

Mr. Rivington, at the London Hospital, lately succeeded in removing one even more heavy (twenty-four ounces) from an elderly man, employing the chisel, as in Lücke's case. The patient did fairly for a time, but sank after an interval of several weeks. The case was of particular interest in two respects: the kidneys were found to be practically healthy, and no correct diagnosis could be made until the bladder was opened.

Prof. Annandale (*Brit. Med. Journal*, January 2, 1886) proposes to extend the use of suprapubic lithotomy to cases of small vesical calculus in boys. Having detected the presence of a small stone in a patient aged four and a half years, he dilated the urethra sufficiently to allow the lithotrite to be passed, then injected four ounces of an antiseptic solution, seized the calculus between the blades of the lithotrite, and made the later press against the vesical wall immediately above the pubes. A very small incision enabled him to extract the stone and to introduce an India-rubber catheter, which was then drawn by the lithotrite along the urethra. Sutures were only used for the superficial structures, urine ceased to flow from the wound after two or three days had elapsed, and the boy was up and well on the tenth day.

Rupture of Bladder.

Dr. Garré (*Korrespondenzblatt für Schweizer Aerzte*, 1885, No. 14) reports an interesting case of this accident. A man, aged twenty, presented urgent symptoms of retention of urine, three hours after a fall of thirty feet in which he struck his abdomen. On catheterization, several ounces of bloody urine were drawn off. In the absence of tenderness or pain in the renal and urethral regions, a diagnosis of rupture of the bladder was made. After distending the rectum, the usual suprapubic incision was made. The peritoneum was found to be uninjured, but the anterior vesical wall had been torn for a length of one inch; the edges of this rupture were stitched to those of the operation wound, and free drainage was provided for. The fistula closed at the end of five weeks, the patient making a good recovery in spite of coincident fracture of one radius and the complication of orchitis and epididymitis. The author holds that in rupture of the posterior wall hardly any urine can be withdrawn by the catheter, but exceptions to this statement have been met with owing to the tear being only subperitoneal.

He gives as the chief reason why this accident has happened so often during intoxication, that the abdominal muscles have by its influence lost to a great extent their elasticity and protective power.

Dr. Varnier (*Progrès Méd.*, 1885, No. 12) gives another instance of rupture apparently from excessive distention. A man, aged thirty-five, after a drunken debauch, was seized some twenty-four hours later with an excessive but powerless desire to empty his bladder; on the following day a considerable amount of urine tinged with blood was drawn off. Seven litres of urine mixed with blood and pus were subsequently removed, but the patient died of peritonitis within a few days after the first symptoms. The bladder was found to be empty, with a small rupture on its posterior wall near to the summit, its borders being irregular and ecchymosed. No trace of disease was found in the rest of the genito-urinary organs; the apices of the lungs showed slight tubercular changes. Varnier dismisses the idea of traumatism either from within or without the bladder, and holds that the excessive distention alone caused the rupture; nor is there wanting good evidence in favor of this explanation, derived both from lithotomists and from post-mortem experiment. The writer refers to a similar case given by MacEwen (*Lancet*, Sept. 27, 1883).

Operative Treatment of Enlarged Prostate.

Mr. Reginald Harrison (*Lancet*, January 16, 1886) briefly alludes to the good results obtained in twenty cases on which he has performed partial prostatectomy, incision of the obstructing portion, or perineal drainage.

Two cases only proved fatal, and in them extensive disease of the kidneys, etc., was found; a third (excision of a malignant growth) died after ten months of comparative comfort. One result of perineal drainage with retention of a tube (which can be closed by a stopcock so as to allow the patient to get about) is to enlarge the aperture into the bladder, and this may subsequently enable the patient to dispense with the use of instruments. The author asserts that even atrophy of the whole organ may follow the pressure of the canula. In urging the advantage derived from the operation he agrees with Professor Braun (*Centralbl.*, November 14, 1885), who performed external urethrotomy on a patient aged sixty, in whom catheterization had only produced false passages. The canula (which should be just large enough to fill the prostatic urethra) was withdrawn after sixteen days; the perineal wound rapidly closed, and the patient was able during the remaining year of his life to micturate with greater ease than before the operation.

He alludes to a similar case of Professor Czerny's, where the same procedure proved fatal, but holds that it should not be regarded as a test of the operation, since the patient was already reduced by nephritis, etc. Unfortunately this complication must be feared in a fair number of cases for the relief of which it is performed. Professor Braun holds that repeated suprapubic aspiration is both painful and inconvenient, and is deterred from leaving a canula in this position by having seen one case prove fatal from subperitoneal infiltration with decomposing urine.

One advantage which he claims for external urethrotomy in enlarged prostate is that the difficulty of detecting and dealing with calculi formed behind it is thus diminished.

Extraction of Foreign Bodies.

Sir W. MacCormac (*Lancet*, January 2, 1886) narrates the successful removal of the blade of a tooth-forceps from the right bronchus. The foreign

body, which measured one inch, could be diagnosed to have become impacted at the site mentioned, and emetics with inversion having failed, a free tracheotomy was done after division of the thyroid isthmus. After many attempts the blade was grasped by forceps and withdrawn. The patient speedily recovered.

Dr. Macgillivray (*Lancet*, December 12, 1885) succeeded in removing an Enfield bullet which had remained embedded for many years in the internal condyle of the femur, with considerable improvement to the patient's use of the limb.

M. Vergely (*Journal de Méd. de Bordeaux*, 1885, No. 46) records the case of a man aged eighty-two, who was admitted for a phlegmonous abscess in the right groin, from which was removed a penholder nearly eight inches long, which the patient admitted having introduced per rectum two months previously. It is probable that the great mobility of the sigmoid flexure accounted for the position of the abscess.

In America.

UNDER THE CHARGE OF

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Rupture of the Ligamentum Patellæ, and its Treatment by Operation.

Dr. Henry B. Sands (*The Medical News*, Dec. 26, 1885), taking as a text two cases which had come under his own care, has given, with the clearness and thoroughness that characterize his work, a valuable account of the frequency, causes, results, and treatment of rupture of the ligamentum patellæ. To the 65 cases collected by Maydl he adds 13 treated in four New York hospitals. The infrequency of the injury, compared with that of fracture of the patella, is shown by taking the number of cases (553) of the last-named injury treated in the same hospitals, the proportion being about 1 to 25.

The cause appears commonly to be a powerful contraction of the quadriceps, in an attempt to avoid a fall, but it has also been caused by violent flexion of the (normal) knee, and by forced flexion practised with the object of overcoming ankylosis. In 3 of the cases collected by Dr. Sands, the rupture occurred in persons who had previously suffered from transverse fracture of the patella on the same side, after intervals varying from eight months to ten years, and after ligamentous union of the fracture, the uniting band being two inches long in two of them. From these, and from other examples of the same singular sequence which he found recorded, he draws two conclusions: 1st. That fracture of the patella may establish a predisposition to rupture of the ligamentum patellæ, either by partial ossification of the ligament, as observed in one case, or by so weakening the limb as to render the individual less able to avoid determining accidents. [Possibly in some of these cases the cause was extensive flexion of the knee, the descent of the patella being limited by adhesions.—Rep.] The second inference is, that the fibrous band

of union between the fragments of a broken patella may be able to bear a greater strain than the normal patellar ligament, even when this band is of considerable length.

In 7 of his 13 cases, the seat of rupture is definitely stated: in 3 it was at the upper, and in 4 at or near the lower attachment of the ligament, and in 2 cases a small piece of the patella was torn off.

The treatment adopted in most of the reported recent cases was essentially that of fracture of the patella: elevation of the limb with the knee fully extended, cold applications to the joint, and the use of pads, straps, and bandages for the purpose of approximating the ends of the ruptured ligament; and, as a rule, such treatment was followed by a fair amount of recovery of the functions of the injured limb. Exceptionally, the reunited ligament was no longer than its fellow, but usually it was more or less lengthened, sometimes to the extent of several inches; and, as a rule, the impairment of the power of active extension bore a direct ratio to the amount of this lengthening.

In Dr. Sands's second case, the injury was of eight months' standing, and his operation—freshening and reunion of the separated ends—appears to be unique. The incision was longitudinal, nine inches long, and in the median line. Before the upper end could be brought into contact with the lower one, many deep oblique and transverse incisions had to be made in the median and lateral portions of the quadriceps; the ends were fastened together with two sutures of stout silver wire, cut short. The joint, which was freely opened during the operation, was drained with two bone drains. The patient at first suffered constant pain, which, however, ceased after the fourth day; the wound healed without suppuration; the patient wore a protection splint during the third and fourth months, and the limb had then become very useful and was gaining in strength and freedom of motion. Apparently the sutures had cut through the ligament and union had taken place by an interposed fibrous band.

Consecutive Double Nephrotomy, on one side for Pyonephrosis, on the other for Acute Obstruction of the Ureter.

At the meeting of the New York Surgical Society of December 22, 1885, Dr. F. Lange reported (*The Medical News*, Jan. 16, 1886) an interesting case in which he had performed nephrotomy, first upon the left side, and then, after an interval of nearly nine weeks, upon the right side.

The patient was a man, thirty-two years of age, who had suffered from urinary trouble, and had had pus in his urine since he was twelve years old. During the preceding three or four weeks the amount of pus, the pain, and the frequency of urination had greatly increased. The pain was felt only in the left side and in the penis; the urine contained much pus, but no blood and no casts. A firm round tumor, as large as the head of a child at term, could be felt in the region of the left kidney; the right kidney appeared to be somewhat dislocated downward, but was not enlarged.

The left kidney was exposed by a longitudinal lumbar incision, and when the pyonephrotic sac was opened, it was found to contain a great number of irregular calculi embedded so deeply in the recesses of the calices that their

removal was prolonged and laborious, and was effected only after some laceration of the tissues, and by the breaking down of interposed partition walls. The wound was drained, and frequently irrigated with a warm borosalicylic solution. The amount of pus in the urine diminished but did not entirely disappear, the tumor became much smaller, the discharge from the fistula was moderate and contained very little urine, and the patient was discharged greatly improved at the end of six weeks.

On the 25th of November the patient began to complain of pain in the abdomen; there was obstinate constipation, and the urine was very scanty. When next seen by Dr. Lange, November 29th, the abdomen was tympanitic and painful, and the principal pain was felt in the right side. There was dyspnœa, a weak pulse, and no urine in the bladder. The diagnosis of occlusion of the right ureter was made. After preliminary exploration of the fistula on the left side, because of the possibility that an inflammatory process originating there might have spread to the right side and have caused the occlusion, and after removal of a considerable number of calculi found in it, the right kidney was exposed by a lumbar incision. The connective tissue under the quadratus lumborum was found infiltrated with a watery liquid, looking like urinary infiltration; the fat was removed from the posterior aspect of the kidney, and in the substance of the latter, near the insertion of the pelvis, was found an abscess, which seemed about to perforate. After opening the abscess, the finger was passed without resistance into the pelvis of the kidney, and on withdrawing it a great quantity of bloody urine escaped. Exploration of the dilated ureter, with a pair of long, slender dressing-forceps, revealed an obstruction which did not give the feeling of a stone. By injecting warm water, this obstruction was promptly washed out; it proved to be a whitish-gray plug, about the size of the terminal phalanx of the little finger, somewhat flattened and crucial, resistant but brittle, and apparently consisting of an old fibrinous clot, in which numerous gravel-like concretions were embedded. A medium sized bougie could then be passed through the ureter to the bladder. Hemorrhage was free, but was easily checked by plugging with iodoform gauze about a drainage tube.

The patient made a rapid recovery, and at the time of the report there remained on the right side only a superficial, healthy-looking, granulating wound. The stones removed, about fifty in number, had a total weight of 23 grammes.

Resection of the Large Intestine for Carcinoma.

This operation, the only successful one of its kind in this country, was done October 22, 1885, at the New York Hospital, by Dr. Robert F. Weir (*The Medical News*, Feb. 13, 1886). The patient, a man fifty-four years of age, had been suffering for the preceding two years with painful and frequent bloody stools, with occasional prolapse of the rectum occasioned by the tenesmus. Bimanual examination under ether disclosed an irregularly elongated mass, the lower surface of which could be obscurely felt by the finger in the rectum, situated near the upper border of the pelvis, and movable from side to side.

The abdomen was opened under the carbolic spray by an incision four inches long below the umbilicus, and the tumor drawn out through the wound.

It was a knobbed mass, four inches long, and its upper edge reached nearly to the sigmoid flexure. Temporary ligatures were placed about the gut above and below the tumor, the mesorectum corresponding to the tumor secured by a row of silk ligatures placed parallel to, and as far as possible from, the bowel, and the included intestine, five and a half inches in length, excised. Two small but enlarged glands were subsequently found in the stump of the mesorectum, and removed. Because of the practical difficulties attending an attempt to reunite the ends of the divided intestine, it was determined to establish an artificial anus in the abdominal wound. The upper end of the lower segment of the rectum was closed by inverting its edges and securing it with a double, and in part triple row of Czerny-Lembert sutures, and the end of the upper segment secured in the upper angle of the abdominal incision, the seat of which was closed by strong catgut sutures passed through the entire thickness of the wall, a continuous catgut suture of the peritoneum, and interrupted catgut sutures of the skin and muscle. There was much complaint of pain during the first five days, and some distention of the abdomen, to relieve which two of the deep sutures were cut. On the seventh day the bowels moved, with the aid of a cathartic, and it was found that the incision had reopened throughout its whole extent, and in the mass of feces filling it was seen a coil of small intestine. Fortunately, adhesions had formed which shut off this coil from the general peritoneal cavity, and no reaction followed this mishap; the intestine was cleaned and the wound closed; it healed by granulation in about seven weeks.

November 14, three weeks after the operation, there was a fecal discharge from the original anus, followed on the next day by the passage of considerable flatus, and on the 16th by the escape of nearly a pint of dark brown liquid, having a strongly fecal odor. No further discharge took place until the 20th, when two ounces of a thin, light brown, purulent liquid escaped through the anus. The finger introduced into the rectum could not feel its upper limit, and a rubber drainage tube passed in for a distance of six inches gave exit to three or four ounces of fetid brownish pus; the tube was left in place for ten days, and the cavity of the abscess daily washed out through it. January 2, 1886, the patient was discharged, rapidly gaining in flesh and strength.

The report is followed by the tabulation of thirty-five collected cases and the discussion of the comparative merits of various details in the technique of the operation, and of the relative safety of reunion of the divided intestine, and of the establishment of an artificial anus. Dr. Weir's conclusion that it is more prudent to establish an artificial anus than to reunite the intestine will probably be accepted by most surgeons, although the percentages of mortality furnished by the two methods do not materially differ. The causes of death are so largely independent of this detail that the question cannot be determined by the percentages of mortality in so small a number of cases. The cases must be studied, not merely counted; and the risk of leakage after reunion of the intestine is one that is not counterbalanced by any of those peculiar to the method by formation of an artificial anus.

Local Anæsthesia by Weak Solutions of Cocaine.

Dr. J. L. Corning (*New York Medical Journal*, Jan. 2, 1886) describes the extension that has been given to the use of cocaine for obtaining local anæs-

thesia, as recommended by him in September, 1885, and the details and modifications of the method of use which his subsequent experience has suggested. He recommends weak solutions—one, one-half, and even one-third per cent. —injected in fractional parts throughout the entire field of operation, in depth as well as in superficial area. When the operation is to be done upon a limb, he recommends the distal application of an Esmarch bandage, then the injection, and then an elastic tourniquet on the central side of the anæsthetic zone. If supplementary injections are required during the operation, he reapplies the Esmarch, removes the tourniquet, makes the injections, and then immediately reapplies the tourniquet. Anæsthesia has been maintained by these means for two hours at a time.

For operations upon the trunk or head, he arrests the venous flow by surrounding the field of operation with a rubber-covered wire ring pressed firmly against the skin by straps tied around the body. No unpleasant constitutional effects have been observed after the use of the drug in this manner.

The absence of clinical details from the paper suggests the propriety of some caution in accepting all that is claimed for this means of obtaining local anæsthesia, especially in view of the facts that it has not always been found entirely satisfactory by some who have employed it both before Dr. Corning did and subsequently, and that the degree of insensibility and the interpretation of its cause are still in dispute. The pain suffered by another is proverbially easy to bear, and is liable to be underestimated; and, further, it is well known that the excitability or conductivity of a nerve rapidly disappears after its blood supply has been cut off. It seems, therefore, desirable that these claims for cocaine should be subjected to careful control experimentation before it is accepted as a superior substitute for ether, and all the more because alarming constitutional disturbances occasionally follow its use.

Since the above was put in type, Dr. Varick (*N. Y. Medical Journal*, Feb. 20, 1886) has reported in detail a case in which he amputated the thigh, using cocaine in this manner after an attempt to obtain general anæsthesia by means of ether had produced alarming symptoms. The method appears to have been completely successful in preventing pain.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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An Attack of Glaucoma following the Instillation of Cocaine.

Manz reports a case of this nature occurring in a woman, aged fifty (*Bericht der 17te Versammlung der Ophth. Ges.*, 1885). The patient was presbyopic, and came to be fitted with glasses. Vision for the distance was about normal,

but the patient had complained of various photopsic manifestations, and there was a shallow anterior chamber. With the ophthalmoscope there was seen a slight cloudiness of the tissue of the disk, and a somewhat deep physiological excavation. Cocaine had been used in the right eye to dilate the pupil and render an ophthalmoscopic examination more easy. On the following day Manz was called to the patient, and was told that on the previous evening she had severe pain in the right eye, headache, and a sudden failure of vision. He found in the right eye a typical attack of acute glaucoma, great circumcorneal and conjunctival injection, chemosis, dilated and immovable pupil, cloudy media and increased tension, and severe pain. An iridectomy was immediately made, and the result was very satisfactory.

The Relation of Certain Glaucoma Symptoms to the Theory of Increased Intraocular Tension.

Pflüger calls attention to the so-called "halo glaucomatosus," and the paracentral scotoma (*Bericht der 17te Versammlung der Ophthal. Ges.*, 1885). He regards the halo seen on and around the optic disk in cases of glaucoma, as an exudation, and that it is almost always accompanied by retinal œdema. In these cases there may also be found layers of exudation upon the iris, ciliary body, and between the ciliary body and the scelera. He next calls attention to certain perimetric peculiarities of the field met with in glaucoma, such as paracentral scotomata, a zonular visual field, and the changeability of the outer limits of the field in glaucoma. He thinks that paracentral scotomata occur much more frequently than has hitherto been supposed, and that this form of scotoma is not dependent upon an increased intraocular tension. The rapid loss of vision occurring in glaucoma fulminans, he thinks, cannot possibly be caused by increased tension, but is due to a serous transudation between choroid and retina. Too much influence has been ascribed to increased intraocular tension as the *direct* cause of the disturbance of function in glaucoma.

The Operative Treatment of Conjunctivitis Granulosa.

Vossius's paper contains nothing new, but is very timely (*Bericht der 17te Versammlung der Ophthal. Gesellschaft*, 1885). He endorses all of Schneller's suggestions, but his method of operating is somewhat different. He recommends the extirpation of the tarsus or retrotarsal fold alone, or of both, as far forward as a line running two millimetres from the free margin of the lid, according to the nature and severity of the case. He usually employs chloroform, and considers it in children absolutely necessary. In operating, the upper lid is everted, and the conjunctiva at the convex border of the tarsus, both at the inner and the outer canthus, seized with forceps by an assistant. The retrotarsal fold is then drawn forward, so that the rugæ are rendered smooth. While the assistant in thus keeping the conjunctiva on the stretch, he divides the diseased portion from one canthus to the other with scissors, first on the side toward the eyeball, and afterward along the upper tarsal margin. The hemorrhage is then checked by iced applications, and the divided tissue is then carefully dissected up and in part cut off, according to the severity of the case. The cul-de-sac is then carefully

washed out with boric acid solutions, a moist boric acid bandage applied, and over this an ice bladder. This bandage is changed daily for four days, all secretion being carefully washed away. Vossius continues the iced applications for fourteen days, and usually within this period the wound has healed.

Observations on Empyema of the Frontal Sinus.

Borthen reports three new cases of this interesting lesion (*Archiv für Ophthalmologie*, xxxi. 4). He considers the diagnosis difficult, but the position of the swelling beneath the brow, the fluctuation which may be demonstrated by palpation, and finally the sensitiveness to pressure, all point to empyema. If a communication with the cranial cavity is feared, it should be seen whether pressure backward upon the tumor will produce any brain symptoms. If a communication exist with the nasal cavity, pressure upon the swelling will cause pus to exude from the nostril. He regards the prognosis as bad unless the treatment is begun early in the development of the disease. The development, though slow, is always progressive, and causes general absorption of bone, dislocation of the eyeball, and inflammation of the contents of the orbit. The most common cause is chronic coryza, which is propagated directly from the nasal fossæ to the frontal sinus. The swelling of the lining mucous membrane closes the communication between the cavities, the secretion collects in the frontal sinus, an abscess is developed, and this gradually destroys the bony wall. A free incision and complete emptying of the contents of the cyst is the only rational treatment. Borthen recommends daily syringing the cavity with a warm solution of boric or salicylic acid, and the introduction of a drainage tube. After three or four weeks of this treatment, the patient may be sent home, and the treatment carried on there.

Further Observations on the Extraction of Intraocular Cysticerci.

Von Graefe publishes his observations upon a series of 45 cases of intraocular cysticerci, within a period of ten years, in which operations for their removal were performed (*Archiv für Ophthalmologie*, xxxi. 4). The extraction was a complete success in 30 cases. The percentage of positive success was therefore 67 per cent., and of negative result about 33 per cent. The average time spent in hospital by all the favorable cases was two weeks. Only one ran an unfavorable course, and this was probably due to the fact that a large amount of vitreous was lost before the parasite was extracted. Most of the unfavorable cases were those in which the parasite was freely movable in the vitreous, and more or less disconnected with the coats of the eye, and was, moreover, surrounded by dense opacities. The cases in which the cysticercus occupied a subretinal position are the most favorable for operation, because it presents at the opening almost as soon as the incision is made. Graefe's method of operating is as follows: After localization of the parasite, one of the four straight muscles is divided, about one millimetre from its scleral insertion. Through the end of the divided tendon a catgut suture is passed, armed at each end with a needle. The sclera is then more freely exposed and the muscle carefully dissected back, so as to make room for the incision in the

sclera. The meridional incision is then to be slowly and carefully made in the sclera, so as to divide only the sclera and choroid. After the extraction of the parasite and a careful cleansing of the wound, the divided muscle is to be reattached to the stump of the divided tendon, the sutures passing through the subconjunctival tissue, and being brought out close to the corneal margin.

A Case of Right Lateral Hemianopsia, with Autopsy.

Wilbrand's paper is a very elaborate one and difficult of abstraction (*Archiv für Ophthal.*, xxxi. 3). The patient was a man, aged sixty-three, who was suddenly attacked by a right lateral hemianopsia, which was at first incomplete, but soon became complete and absolute. There was double "choked disk" and impaired vision in the left eye, and normal vision in the right eye. The color sense was normal, as was also the peripheral part of the left visual field. After several weeks an apoplectic right hemiplegia appeared, without loss of consciousness, with paralysis of the right facial and hypoglossus. There was no great disturbance in sensation, but there were marked vasomotor disturbances of the right extremities. Later the hemiparesis diminished, but there ensued frequent contractions of the muscles of the right arm and leg. Aphasia gradually supervened, and the left halves of the visual field became concentrically limited. Three years later the patient committed suicide. A review of the case shows that two centres of disease were developed in the left hemisphere, with an interval between them of several weeks. The first was probably a tumor in the left occipital lobe. But the autopsy showed, in place of the tumor, a spot of softening caused by emboli of small cerebral vessels. The softening extended in a sagittal direction as far as the cortex of the end of the occipital lobe. As the cortex of the visual centre in the occipital lobe is the only spot in which light is perceived, it follows that the various photopsic manifestations, as signs of spent irritation, can only be perceived in this same spot. A small focus of disease at first hindered the optical conductibility to the visual centre, without completely destroying it; but new foci of disease increased the visual defect, and eventually entirely destroyed the conductibility—complete and absolute hemianopsia. Wilbrand thinks it may be assumed that by the sudden influx of cerebrospinal fluid toward the region of the obstructed vessels, and the consequent sudden diminution of tension in the walls of the ventricles, the ependyma was irritated, and this was followed by an increased secretion of cerebrospinal fluid. The occipital lobe having become œdematous, the whole intracranial space was gradually diminished, and the increased quantity of cerebrospinal fluid was driven into the sheath of the optic nerve, and the latter was stretched or distended. Later, when the atrophic contraction of the occipital lobe began, and the intracranial space became again greater, there was a recession of all the symptoms of "choked disk." The history of this case proves that in embolic softening of the hemispheres the ophthalmoscope may show "choked disk." This case also shows that a contraction of the sagittal medullary fibres, and a softening of the cortex of the under surface of the left occipital lobe, of the posterior half of the gyrus hippocampi, and of the posterior half of the third temporal convolution, with right lateral hemianopsia, may cause symptoms of aphasia. The descending atrophy of the left optic tract through the

chiasm into the optic nerve is probably due to the softening of all the primary centres of the optic nerves, especially of the corpus geniculatum externum. It is probable that the latter body serves as a reflex nutritive centre for the optic tract, chiasm, optic nerve, and retina.

The Etiology of Suppuration and Inflammation after the Extraction of Cataract.

Wecker's third article (*Annales d'Oculistique*, Nov.–Dec. 1885) begins with a rigid differentiation between a mediate and immediate inoculation or infection. He regards it as a very difficult matter to arrest a suppurative process which has manifested itself within twenty-four hours after the operation by a marked increase of the conjunctival secretion, a rapidly occurring chemosis, turbidity of the aqueous, and violent ocular and periorbital pain. He emphasizes the necessity of great care in maintaining the absolute cleanliness of all instruments by prolonged immersion in absolute alcohol or in the flame of a lamp. Care must be taken that the instruments touch no part of the head or eye of the patient, except the points involved in the operation. All eversion of the flap or contact of its internal surface with the margin of the lid must be carefully avoided in order to escape the possibility of what Wecker calls "intraocular infection." He thinks that the modern flap operation is as free from the dangers of suppuration as is the peripheral linear incision. He agrees with Horner in believing that the great majority of rapid suppurations occur after the reëstablishment of the anterior chamber, and that the prolonged efflux of the aqueous humor acts favorably against suppuration. He insists that the constitutional changes which the tissues of the eye may present cannot alone furnish sufficient cause for the development of a suppurative process in the cornea and eyeball; that they only predispose to an easier evolution of the infecting germs coming from without. Moreover, the alterations and lesions which accompany traumatic shock and contusion are purely predisposing, and do not necessarily lead to suppuration without the intervention of the irritation which furnishes the infecting germ. The suppuration depends solely upon the infection of the lips of the incision in the eye, or upon the introduction of infecting germs into the interior of the eyeball. The antiseptic methods of operation and treatment must be persisted in the more carefully if the condition of the patient predisposes to a less exact coaptation of the lips of the wound and a consequent retardation of the healing process. An extremely peripheral wound, and the addition of an iridectomy, increase materially the danger of inflammation following the extraction. The nearer the incision is made to the non-transparent part of the cornea, the less is the height of the incision, and the less is the gaping of the wound necessary to the free extrusion of the lens, the greater, also, are the dangers of the iris being caught in the angles of the wound. He considers that a simple extraction by a flap incision does away almost entirely with the danger of the occurrence of irido-choroiditis in the other eye, which has been observed not infrequently after the linear extraction combined with iridectomy.

Demonstration of Tubercle Bacilli in Tuberculosis of the Conjunctiva.

Ulrich's report is very interesting (*Centralbl. f. prakt. Augenheilk.*, December, 1885). The patient was a man aged thirty-two, who for three years had complained of swelling of the lids, lachrymation, and muco-purulent secretion of the right eye. The lids were thickened, and there was ptosis. The lower half of the palpebral conjunctiva of the lower lid, the inferior cul-de-sac, and a narrow margin of the ocular conjunctiva were the seat of an ulceration, reaching from external to internal canthus, with irregularly eroded, undermined margin, and grayish opaque base. A few granulations, which bled easily, were at the bottom of the ulcer. The rest of the conjunctiva was thickened, velvety, and injected. The same thing existed in the upper lid, with three small ulcers near the outer canthus. The semilunar fold and caruncle were hypertrophied; the cornea was intact; the patient had a well-marked family history of tuberculosis, and suffered himself from cough, expectoration, and hæmoptysis. The conjunctiva of the lower lid was excised and hardened for examination. It was found changed into a vascularized granulation tissue, and filled with large and small circumscribed tubercle nodules, with central caseous degeneration. Here and there were patches of diffused tubercular infiltration. Tubercle bacilli were easily and distinctly visible.

Corneal Staphylomata and Anterior Synechiæ, and their Results upon the Eye.

Abadie's article is a practical one (*Arch. d'Ophthal.*, Nov.–Dec. 1885), and is mainly devoted to a description of his method of operating in such cases. When he wishes to prevent the increase of a staphyloma or to divide an anterior synechia, he punctures the cornea with a narrow cataract-knife at the margin of the staphyloma, but in intact corneal tissue. If there is no anterior chamber he divides the iris, passes into the posterior chamber, and makes his counter-puncture in the cornea on the other side of the staphyloma. Then, by a to-and-fro motion, the base of the staphyloma is divided carefully, leaving a small bridge of conjunctival tissue so that the wound may not gape too much. In the case of a delicate anterior synechia, without any alteration in the curvature of the cornea, this bridle may be divided by the narrow knife as in the previous operation, or by the pince-ciseaux of De Wecker. It should not be forgotten that these delicate narrow anterior synechiæ often are as likely to lead to disorganization of the eye as those which are very broad and extensive.

On Certain Operations Upon the Eyelids.

Landolt's paper (*Arch. d'Ophthal.*, Nov.–Dec. 1885) begins with the description of an operation for ectropium. He begins by making a deep conical incision in the ectropium through the entire length of the lid, and close to its edge. Two or three millimetres from this a second analogous incision is made which meets the second in the deep tissues of the lid. The two incisions thus form the radii of the everted pad or portion of

the lid. The conical piece is then excised, and two or three of Snellen's sutures are introduced and tied over pieces of drainage tube in such a manner as to produce a well-marked entropium. This assures the juxtaposition of the lips of the wound and a resisting cicatrix. A careful antiseptic dressing is then applied and renewed twice a day. The ligatures are removed on the fourth or fifth day, and the artificial entropium at once disappears. In cases of distichiasis Landolt suggests a modification of the Jæsche-Arlt operation as follows: Instead of making the second incision a curved one with convexity upward, he makes the two incisions parallel, and the extremities of the strip are divided by scissors. In this way the loss of substance becomes rectangular, and the effect produced on the lashes by the reunion of the margins of the excision is more marked. In separating the lid into two leaves he cuts around the entire lower border of the tarsus, so that the strip of skin may surely comprise all the abnormal lashes. In severe cases of distichiasis he detaches or dissects up the external or anterior leaf of the lid with the ciliary margin, and cuts out a rectangular piece of the skin from the lid surface. He then introduces sutures in the upper border of the strip, but instead of bringing them out at the upper margin of the wound he carries them subcutaneously above the eyebrow, brings them out, and then ties the knots over pieces of drainage tube in this locality. In cases requiring blepharoplasty of the lower lid he carefully detaches the conjunctiva along the entire orbital margin and dissects it up freely as far as the eyeball. He then makes an incision parallel to the palpebral margin in the upper lid and distant two mm. from it, reaching from one end of the lid to the other, and extending as deep as the tarsus. A second incision is then made of the same length as the first and parallel to it, and distant from it seven mm. This flap is then dissected free, leaving the ends still attached, and is lowered and placed in position over the raw surface of the inner or conjunctival leaf of the lower lid. The transplanted flap is then carefully stitched into its new position by numerous fine sutures, and the wound in the upper lid is closed in the same manner. Landolt claims excellent results from this method. He believes highly in the great value of a method of operating based upon the utilization of the two separate leaves of the lid, an anterior or external and a posterior or internal, and gives an account of several cases which have been operated upon successfully in this manner.

Extraction of a Cysticercus from the Vitreous Humor.

Haltenhoff (*Annales d'Oculistique*, Nov.–Dec. 1885) reports an interesting case of this nature in a man aged thirty-eight. The steps of the operation were as follows: The patient was placed on his back, and a carbolized silk ligature was passed under the conjunctiva in front of the insertion of the inferior rectus, the two ends were tied and given to an assistant to direct the movements of the eye. The conjunctiva and capsule of Tenon were then divided somewhat obliquely parallel to the external border of the muscle, beginning at a point half a centimetre from the corneal margin, and about twelve millimetres long. The tissue was carefully dissected away from the eyeball, leaving the sclera exposed. The patient was then placed in a sitting posture, with the head bent slightly forward and to the right. The sclera was then punctured at the posterior end of the wound, and incised

from behind forward. As soon as the wound gaped, a grayish-white membrane appeared, and as the incision was completed, the entire sac containing the animal made its exit from the eye. The wound was not closed by sutures, and simple borated dressings were applied. The wound healed rapidly, though a slight iritis occurred, and the patient was discharged on the eighth day. Two months after the operation the vision was $\frac{3}{L}$.

On the Inspergation of Powdered Jequirity in Cases of Trachoma.

Alt has been using the powdered jequirity in place of the solution, for the cure of trachoma, and draws the following conclusions (*Amer. Journ. of Ophthal.*, Nov. 1885): 1st. The inspergation of jequirity powder seems to be a much safer method of applying the drug than the solutions 2d. The effect can be well regulated and almost confined to a small portion of the lid. 3d. In order to produce this effect in the way just mentioned, the powder must be applied directly to the parts to be affected by it. 4th. A peculiar gray infiltration of the granules, a few days after the inspergation, will give an idea of what number of granulations are going to disappear.

Remarks on the Physiological Action of Cocaine.

This paper by Eversbusch (*Centralblatt für prakt. Augenheilk.*, October, 1885) is of some interest. He begins by reviewing a paper by Pflüger, and criticising certain statements in it. He thinks that the effect produced on the conjunctival vessels by the local instillation of cocaine, may also be expected in the vascular system of the iris and ciliary body. As regards its action on the ciliary muscle, Eversbusch considers the cycloplegia, like the paralysis of the sphincter iridis, to be due to ischæmia of the muscular tissue. It is evident that with a diminished blood-supply to the ciliary body, the power of contractility of the ciliary muscle, which forms the bulk of the ciliary body, will also be diminished. A similar condition is met with in the weakness of accommodation occurring in various forms of secondary or idiopathic anæmia, or after exhausting diseases. According to Weber, cocaine causes a distinct diminution of the corneal tension, which must be, at least in great part, attributed to a diminution of the intraocular pressure. Eversbusch thinks, however, that the accommodation is not lessened or paralyzed by a single instillation of cocaine hydrochlorate, even in a five per cent. solution, but that repeated instillations will produce a more or less marked paralysis of accommodation, though always of slight duration.

The Dangers of Cocaine.

At a meeting of the Ophthalmological Society of the United Kingdom (*Ophth. Review*, Dec. 1885), Nettleship asked whether the gelatine disks of cocaine had proved entirely satisfactory in the experience of the members of the Society. His suspicions had been excited by the occurrence of a run of serious cases of panophthalmitis at St. Thomas's Hospital, while at the same time the cases at Moorfields had done well. At the former hospital he had employed gelatine disks of cocaine, and Messrs. Savory and Moore had in-

formed him that as cocaine was hygroscopic, the gelatine disks were always moist, and that it was impossible to keep them thoroughly dry. It was possible that the disks might afford a breeding-ground for pathogenic organisms. Solutions of cocaine also apparently had a tendency to cause panophthalmitis and chronic interstitial keratitis.

A Contribution to the Employment of Massage in Ophthalmic Therapeutics.

Dantziger makes an earnest appeal for the more frequent employment of massage in certain chronic diseases of the conjunctiva and cornea. He thinks that the massage should not be dry, but should always be made with some oleaginous material like an ointment, and recommends a salve made of hydrarg. præcipitat. flav. 0.1 part, and vaseline 6 parts. A small portion of this is introduced into the cul-de-sac, and the lids are then closed. The index-finger of the right hand is then placed on the centre of the upper lid, and slight rubbing movements from right to left are made over the eyeball, through the medium of the lid. The massage is done once a day, for a period of half a minute, and should be methodical, delicate rubbing. In cases of old corneal opacities, this massage must be persisted in for a long time before any effect is seen. It acts in a mechanically depleting way, stirring up old, torpid exudations and organized products of inflammation in the cornea, and pressing them into the lymph channels. It also acts as a direct source of irritation, and thus hastens absorption of exudations.

The Treatment of Diseases of the Nasal Duct by the Aid of Irrigation.

The paper by Annuske (*Archiv für Ophthalmologie*, xxxi. 3) is based upon an old idea, though the method in which it is carried out is somewhat novel. He makes use of curved canules of a peculiar shape, and connects them with an irrigating vessel by means of a piece of rubber tubing about a metre and a half long. He first divides the upper canaliculus as far as the lachrymal sac, and then incises the nasal duct by means of a Stilling knife. He then introduces the canule into the lachrymal sac and opening of the nasal duct, and injects a varying quantity of ice-water through the duct. He treats nearly all the different diseases of the sac and duct in this way, and never uses any probes in the duct. Care must be taken to avoid placing the irrigating vessel too high above the patient's head, or the water may pass into the subcutaneous cellular tissue and cause considerable pain. He usually employs from a litre to a litre and a half of ice-water. If the case be one of purulent inflammation, he uses three parts of water and one part of a one per cent. carbolic acid solution. If the discharge of pus is profuse, he injects a certain proportion of a one or two per cent. solution of carbolic acid before using the ice-water. He also varies the temperature of the water according to the case, and in cases of pure stenosis of the duct, in elderly people, he even employs lukewarm water. He irrigates once a day for about four weeks, and then gradually diminishes the frequency of the application, and claims better success, in all cases, than by any other method of treatment.

Hints for Cataract Operations.

Arlt's paper (*Archiv für Ophthalmologie*, xxxi. 3) is a very practical one, abounding in hints and suggestions in diagnosis, pathogenesis, etiology, and treatment. One of the earliest points to determine is whether the clouding of the lens is the sole cause of this disturbance in vision, or only a secondary and assisting cause. If the opacity is progressive, and extends over the greater part or the whole of the lens, it must be made clear to both surgeon and patient what will be gained in sight under the most favorable circumstances, and what will be lost under the most unfavorable. Arlt thinks that humanity forbids us to wait until the second eye has become blind before operating upon the first eye. When both eyes are ready for operation, prudence suggests that only one eye should be operated upon at a time. Of course, it must be considered what influence is exerted upon the functional activity of the retina by the continued presence of a cataract of the congenital variety. When, in such a case, an operation is deemed advisable, it is better to perform it while the child is still very young, even in the nursing age, for at this period of life the retrogressive metamorphosis is much more rapid, and the removal of hypermature, shrunken cataracts, is in general more difficult than when the lens is simply cloudy, and the capsule is still unchanged. In the operation of extraction, the location of the incision in the scleral margin involves the conjunctiva in the wound, and this may be made use of to form a conjunctival flap, to aid in early closing of the wound. Arlt does not make his incision as far back in the sclera as Graefe proposed. He prefers to make an iridectomy, because it would be with difficulty avoided in such a peripheral incision; but he makes a narrow coloboma, and cuts out only a small piece of iris. After the capsule has been opened and the cataract extracted, he lays special stress on the necessity of carefully removing all the soft lens fragment that may have remained behind within the eye, by gentle pressure and counter-pressure, and by movements of massage. In some cases it is absolutely necessary to make the iridectomy some weeks previous to the extraction, though in most cases this may be dispensed with.

A New Method of Operating upon Unripe Cataracts, with a Contribution to the Subject of Antisepsis in Ophthalmic Surgery.

Wicherkiewicz (*Klin. Monatsbl. f. Augenheilk.*, Nov. 1885), in this paper, offers a substitute for the combined iridectomy and massage, followed later by extraction, which Förster proposed to employ in cases of immature cataracts. In suitable cases he makes the modified linear section of von Graefe with a moderate conjunctival flap and an upward iridectomy. A circular piece of the capsule is then excised and removed with the iris forceps. By slight pressure upon the cornea the nucleus is extruded, and with it a quantity of the soft lens matter. He then takes a peculiarly constructed glass irrigator, with one long curved jet-pipe furnished with a silver end-piece, and a short, straight tube, by which the irrigator is filled. The irrigator having been filled with a one per cent. solution of boric acid, first boiled and then allowed to cool to a temperature of 30° C., he takes it in his hand, covering the entrance tube with one index-finger, and carefully introduces the silver end of the long

tube into the anterior chamber as far as the margin of the pupil and behind the iris. The index-finger is then removed from the other opening, and the pressure of the atmosphere drives the fluid out of the irrigator into the anterior chamber, and washes out the soft lens matter through the wound in the cornea. This irrigation is continued until all the cortex is removed, and the pupillary space appears black and clear. The eye is then washed and bandaged in the usual antiseptic manner.

The Employment of Disks of Gelatine for the Occlusion of the Corneal Wound, after the Extraction of Cataract.

Galezowski's ingenuity seems irrepressible (*Recueil d'Ophthal.*, Oct. 1885). He proposes to bring about the rapid healing of the corneal wound by preventing the entrance of microbes from without, and thus avoid all possibility of suppuration, by covering the whole length of the wound with a disk of gelatine, which is caused to adhere in an ingenious manner to the surface of the eyeball. He composed a sort of gelatinous court-plaster, which is perfectly well borne by the eye, which adheres to the wound, dissolves little by little, and disappears at the end of eight or twelve hours. These little disks of gelatine are 0.5 mm. thick, and both surfaces are covered with a concentrated solution of cocaine, to which a weak solution of mercuric bichloride has been added, in the proportion of 0.25 gramme to 1000 grammes. One surface of each disk is covered with a glue which attaches it lightly to the cornea, and prevents it from being displaced by the movements of the lids. When all is ready the disk is slightly moistened in warm water, introduced beneath the upper lid, and placed over the wound; the lids are then replaced carefully, and the bandage is at once applied.

An Internal Lachrymotome.

In the *Recueil d'Ophthal.*, Oct. 1885, Mengin describes a new instrument which he has devised for the lachrymal passages, which is simply a modification of Galezowski's knife. The shank is round, 12 mm. long, and diminishes gradually in diameter from a millimetre to half a millimetre. The blade is very delicate, and its entire circumference is a cutting edge; it is 4 mm. long and 1 mm. wide, and the angles are rounded. This blade may be introduced through the lachrymal canals without wounding the walls. An obstruction having been found in the duct, the instrument is introduced through the lower canaliculus until it reaches the obstruction, when it is pushed through and divides the stricture. When it is felt to have entered the lachrymal sac, it is withdrawn to the point of stricture, turned partially round and again pushed forward, and this manœuvre is repeated as many times as may be deemed necessary.

Keratitis Dendritica Exulcerans Mycotica.

In this paper (*Centralblatt für prakt. Augenheilk.*, October, 1885) Emmert presents a hitherto undescribed form of ulcerative inflammation of the cornea, illustrated by six cases. From the histories of these cases he concludes that phthisical and scrofulous persons in tolerable health are most liable to be attacked by this form of arborescent keratitis, and mainly between the ages

of twenty and forty-five years. The disease attacks both sexes with about the same frequency, and usually those people who have never before had any inflammation of the eyes. It usually occurs spontaneously in late winter, spring, and autumn, and spreads very rapidly, often reaching its height within two or three days. The symptoms are photophobia, lachrymation, swelling of the conjunctiva of the upper lid, injection of the ocular conjunctiva, a grayish subepithelial opacity of the cornea, which begins either as a small infiltrated spot with branching processes, or as a narrow streak which extends, divides, and sends out processes. The epithelium of this opacity soon becomes elevated and cast off, leaving little furrows in the cornea. As the loss of epithelium extends the reflex blepharospasm increases, and the ulcerative action usually extends through the anterior elastic lamina into the corneal tissue proper. The patients sometimes complain of neuralgic pains in the temple. The usual duration of the disease is from three to six weeks, though it may be cut short sooner by frequent instillations of the cul-de-sac and ulcerated spots with mercuric bichloride solutions and eserine. The opacities remain for weeks and months, but gradually clear up without leaving facets behind them. The pathology and pathogenesis of this disease are somewhat difficult of explanation. When the process begins with a superficial loss of epithelium, we naturally think of some infection from without at that particular spot, in default of which the lesion would remain a simple, superficial, ulcerative keratitis, and when we consider the double bacilli which are found in the deeper epithelial layers, this idea of infection from without receives strong support. So strong is this probability that we at once look for some point of entrance in the cornea, and if one is not found we assume its existence, or else assume that the infecting bacilli immigrated from the ocular conjunctiva. The disease is not a constitutional one, or it would be met with much more frequently. It must be regarded as a mycotic corneal inflammation, at the bottom of which, however, is a strong constitutional predisposition to the rapid development of mycosis.

A Case of Traumatic Cataract Treated by Aspiration.

This odd method of operating has recently been practised by Rogman (*Annales d'Oculistique*, Sept.–Oct. 1885). The patient was a man aged thirty, who was struck in the left eye by a piece of iron, which perforated the centre of the cornea and wounded the lens. There was blood in the anterior chamber, and the latter and pupillary space were filled with soft lens matter. Six weeks later the operation by section was performed. The hands, instruments, and face of the patient were carefully disinfected and the eye was anæsthetized by cocaine. The cornea was perforated by a broad needle near the centre of the internal quadrant. Subconjunctival injection became very marked, and a small amount of blood appeared in the anterior chamber. The canula of the aspirator was then introduced and suction begun. With each movement of suction, the iris was drawn toward the eye of the canula, and the operation was ended before the pupil was entirely cleared. Cold compresses of mercuric bichloride (1 : 2000) were then applied, and when all pain had ceased, an antiseptic dressing was put on. The next morning there was profuse secretion and the eyeball was markedly injected, but there was no pain. Four leeches were applied to the temple and the cold applications

were continued. On the second day all inflammatory symptoms had subsided, and the few flocculent masses in the pupil and anterior chamber were absorbed in a few days. The opaque capsule gradually receded, and the pupil became eventually entirely black. The suction instrument employed was that devised by Mr. Teale, and proved entirely satisfactory.

The Cure of Progressive Myopia by Iridectomy and Sclerotomy. The Circulatory Theory of Myopia.

In this article (*Annales d'Oculistique*, Sept.–Oct. 1885) Dransart undertakes to prove that the muscular and accommodative theories of the causation and development of myopia, as formulated by von Graefe and Javal, are faulty, and insufficient to explain the facts; and he substitutes for them the circulatory theory of the origin of myopia. He starts out with the assumption that the myopic process is primarily caused by the increase of the intraocular fluids, and secondarily by the distention of the ocular coats. The increase of the intraocular fluids is the expression of a circulatory disturbance consisting in a too abundant secretion, or in an insufficient excretion, or in both. These conditions are found in glaucoma, and the difference which exists between the glaucomatous process and the myopic process consists in the fact that in one case the coats of the eye are more resisting and do not yield, while in the other case they do yield, and the excess of tension is not appreciable in consequence of this increase of capacity. Dransart's therapeutic methods are recommended in cases of progressive myopia in which blindness threatens, with or without lesions of the coats or of the media. When the visual acuity is less than a quarter and is progressively diminishing, Dransart performs either a sclerotomy or an iridectomy, but he regards either as an heroic procedure. The analogy between glaucoma and myopia receives brilliant confirmation by the therapeutic results obtained in this way. The myopia may end in glaucoma, and the glaucoma may give rise to myopia. Hence the author reasons that the circulatory theory, which explains the production of glaucoma, will also explain the genesis of myopia. He thinks that in the future, sclerotomy or iridectomy must be performed in those cases of progressive myopia in which the visual acuity is reduced to a quarter or even less, and in which the tendency to progression has not been arrested by ordinary therapeutic measures. These operations arrest the progress of the disease, maintain the actual amount of visual acuity, and even double it, and may restore it when totally abolished.

OTOLOGY.

UNDER THE CHARGE OF

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Fracture of a Small Portion of the Tympanic Plate from Efforts to Remove a Pin Supposed to be in the Ear.

This unfortunate result of unskilful manipulation for the removal of a foreign body supposed to be in the ear occurred in a woman, fifty years old, who was brought, subsequent to the lesion, for treatment of the inflammation

in her ear, to Dr. Thomas Barr, of the Glasgow Hospital for Diseases of the Ear (*Archives of Otology*, vol. xiv. 239–241, Dec. 1885). It appears that the woman habitually scratched her ear with a pin, in order to relieve itching in the organ, and upon one occasion, while in bed, she fancied the pin had slipped into her ear, which she had been scratching before going to sleep. Impressed with this erroneous idea, she hastened to a physician, who, taking the woman's statement of her impression for a fact, proceeded to make efforts at removal of the pin by means of forceps. These efforts were rough, and very painful to the patient. At first no result beyond pain was obtained, but finally the forceps were made to grasp something, and the physician, whose arm was aided by traction on the part of the patient's husband, succeeded in getting something out. It was, however, neither a pin nor a portion of one. After this, for four weeks, the woman suffered a great deal of pain and nervous prostration, sleep being almost impossible.

Dr. Barr found purulent secretion in the orifice of the affected auditory canal, and a polypoid growth was also found near the meatus, blocking the entire lumen of the canal, and apparently attached to its antero-inferior wall. This growth was removed, and its attachment was found to mark an opening in the soft parts, leading to a hard, rough, slightly movable substance, in the position of the rough outer edge of the tympanic plate. In the antero-superior quadrant of the membrana tympani there was a small perforation, from which muco-pus escaped from the drum cavity. The hearing was very defective, being for the watch $\frac{\text{contact}}{40}$. A few days after this examination there were removed from the canal of the ear "two pieces of semi-dead bone," evidently from the edge of the tympanic plate. In two weeks from this time the ear had entirely healed, the perforation in the membrana tympani had closed under proper treatment, and the hearing improved.

This is another instance of the evil consequences of an endeavor, on the part of a very unskilful man, to remove a foreign body from the ear before it has been ascertained whether or not a foreign substance is really in the organ. In this instance, as Dr. Barr observes, the pin either did not get into the ear at all, or, if it did, it must have fallen out soon after it slipped in, unknown to the patient. The physician she consulted first, taking her statement for granted, assumed the pin was in the ear. In his endeavor, then, to remove it, he seized the antero-inferior angle of the tympanic bone at the junction of the cartilaginous and osseous parts of the auditory passage. Such a seizure of bony substance would convey to an operator without experience that he had laid hold of a foreign substance, and his mind imbued with this erroneous idea, he would then make excessive efforts at removal of the object. In this case the efforts at traction were very great, and at last a snapping sound was heard, and, although the operator removed nothing, he desisted from further efforts. The subsequent inflammation, aided by constant poulticing, accounted for the suppuration, polypus, and perforation of the tympanic membrane.

Laceration of Both Membranæ by Unskilful Endeavors at Removal of Foreign Bodies from the Ear.

Bürkner, of Göttingen, has related a case which demonstrates the danger of the endeavor, on the part of unskilful persons, to remove foreign bodies from the ear (*Archiv f. Ohrenh.*, Bd. xxii. p. 203).

It appears that a girl, seven years old, put two lentils in each ear, in play. Although the child was not suffering at all, the village doctor was instantly summoned, and armed with a large forceps, but without any speculum, proceeded to search for the foreign body. As this rough treatment produced considerable hemorrhage, and as the child was restless under the infliction, a continuation of the search was postponed until the next day, and then one ear was emptied of its foreign contents. The other ear was cleared on the third day, after a long process of boring, under chloroform. It is stated that various instruments were used in this last operation. The child suffered greatly on the days of these operations and all the rest of the week.

Soon after the last operation pus began to flow from each ear, and therefore the child was brought to Bürkner's clinic. It was found that the auditory canals were greatly swollen, deprived of epidermis over a considerable surface, and filled with fetid pus. Both membranæ were deeply congested and swollen, and presented deplorable evidence of the roughness of the treatment. The front and lower part of the right membrana tympani was entirely torn away. The left membrane was ruptured both behind and in front of the malleus, and between the two openings thus formed was a thin band of tissue covered with blood. The manubrium on both sides was invisible. For three weeks the membranæ remained thus swollen; then, gradually, the edges of the perforations became smoother, and on the left side the two perforations coalesced, and both drums remained perforated. The suppurative discharge ceased in the course of a few weeks. The hearing at first was almost entirely suspended; but gradually it improved a little, so that, finally, on the right side it was $\frac{5}{1\,3\,0}$, and on the left $\frac{3}{1\,3\,0}$ for the watch, and it has remained at this low point up to the present time. No treatment could improve the hearing; hence it seems that in the rough endeavor at extraction the ossicles were wounded. This is another instance proving that no one but the specially skilled should use instruments to remove foreign substances from the ear, and that no one, no matter how skilful, should resort to instruments until syringing with warm water has been tried and found insufficient. In this case, as in numerous others, it was the rough treatment, and not the presence of the foreign body, which did harm. To act as this surgeon did toward his little patient is malpractice, and should be punished as such.

A New Telephonic Apparatus for Examination and Treatment of the Organ of Hearing.

Dr. L. Jacobson, of Berlin (*Deutsche med. Wochenschrift*, Dec. 31, 1885), has devised an instrument of the above-named character, for the treatment of some kinds of deafness, by a form of passive motion, denominated by Lucæ "sound-treatment." In this treatment the source of sound is a tuning-fork, formerly used for diagnostic purposes only, but in this new way, employed as a therapeutic agent. Prof. Lucæ[1] states that he has succeeded in a series of cases of subjective aural sounds in entirely banishing the latter, or in essentially relieving them by his so-called "sound-treatment." In order to accom-

[1] Zur Entstehung und Behandlung der Subjectiven Gehörsempfindungen, Berlin, 1884. Otto Enslin.

plish this, external sounds are allowed to act upon the affected ear, from one to ten minutes daily. Deep notes are employed when the subjective sounds possess a high character, like whistling or singing, and high notes are employed when the subjective sounds are deep, like the sound of bells, roaring, humming, etc.

In order to produce a continued sound, it is recommended to use the interruption-tuning-forks of Helmholtz, especially the c fork for a deep note, and for high ones the ordinary forks c^3 and c^4, as these notes are not so easily produced by the electromagnetic interruption-tuning-forks. Since the pitch of the subjective sounds which come under treatment vary greatly, it seems desirable, in the method of treatment just mentioned, to be able to employ a great variety of notes. To procure a large number of electromagnetic tuning-forks, however, would be exceedingly costly, as one such costs seventy-five marks (German). This fact has induced Dr. Jacobson to have constructed an apparatus, at once comparatively cheap and capable of producing a large number of constant tones lying within four or five octaves, viz., from contra c to c^3.

It consists of an induction apparatus, the secondary spiral of which is connected with a telephone, while the primary circuit contains one or several elements, besides an automatic interruption-apparatus. The latter is somewhat like the Wagner-Neef hammer, but differs from it in having several springs for interrupting the current, which, by a simple arrangement, can be connected with one another, and by virtue of their dissimilar dissonance can evoke a varied number of current-interruptions in a second, in the primary circuit. The telephone must, therefore, by the insertion of different springs, receive an unequal number of current impulses, and, hence, emit a variety of high notes.

It is claimed by Dr. Jacobson that the notes produced by his instrument exceed in intensity those of electromagnetic tuning-forks. Besides being of use in the so-called "sound-treatment," the apparatus may be used as a means of testing the hearing. By means of this apparatus, it is claimed that notes of fixed intensity and various pitch may be used by bone-conduction through the head, if into the receiver of the telephone a bar be fixed, the free end of which rests on the skull. This test can be employed even in those whose hearing is already greatly impaired, because the sound from the telephone would be heard by aërial conduction, by a good ear, before the aforesaid bar extending from the telephone could be placed in contact with the cranium. In such a case it would be impossible to test the perception by bone-conduction, in isolation. The purity of the tones evoked by this apparatus is not equal to that produced by electromagnetic tuning-forks, but this is not considered of moment in the object for which the apparatus is used.

The Mechanical Treatment of the Membrana Tympani and the Ossicula Auditus.

The subject of passive motion in the treatment of chronic aural disease, especially chronic catarrh of the drum cavity and the mucous covering of the auditory ossicles, is further illustrated by the observations of Dr. Adolph Hommel, of Zurich, upon himself and a few patients (*Archiv für Ohrenheil-*

kunde, Bd. 23, pp. 17–30, Dec. 1885). The writer of this article is not an aurist, but his observations upon himself and his few aural patients are very interesting, and if they have been made accurately, are worthy of attention. His method of procuring curative, gymnastic effects upon the membrana and the ossicles consists in the following: As is well known, pressure inward of the tragus upon the external auditory meatus produces an air-tight closure of the canal. By means of such a sudden closure the membrana tympani is impinged upon by a wave of condensed air, and driven inward. If now immediately the pressure is removed from the tragus, the wave of compressed air is reflected from the membrana, and a momentary slight rarefaction of the air in the canal is brought about, which permits of a recoil on the part of the membrana, from its tension, so that each movement inward of the membrana is followed by a counter-movement outward with all its attachments. By repeated efforts of this kind, an inward and outward movement of the drum membrane can be kept up as long as desired. Dr. Hammel believes that a rhythmic motion of 120 vibrations per minute possesses the greatest advantages, as this form of the procedure produced the best results in his own case. He asserts that in his own case, chronic aural catarrh, all the usual methods of treatment failed, and some of them he thinks made his hearing worse. He proposes for his method the name of "tragus pressure."

In his own case he began this treatment in 1881, his hearing being 10 cm. for watch in the left ear, and 150 cm. in the right ear. Bone conduction was good on both sides. At the present time his hearing for the same watch is 610 cm in the right ear, and 40 cm. in the left. An opacity, observed in the right membrana tympani, before this treatment began, is said to have disappeared. This result is attributed to the stimulation of the lymphatic system in the membrane, and a consequent absorption of the products of inflammation.

In another case—catarrh of the drum—the hearing rose from 150 cm. to 610 cm.; in another instance in which there was a perforation in the left membrana, the hearing rose from 5 cm. to 160 cm., and remained thus improved; and in another case—chronic aural catarrh, with great opacity of the membrane—an improvement from 12 cm. to 340 cm. ensued.

The author recommends the use of "tragus pressure" as a prophylactic against the deafness of old age, since, by the use of this treatment, ankylosis of the ossicles, the chief evil in the deafness of old age, is warded off. "Tragus pressure" is recommended by the proposer as entirely harmless; if, however, it should be used too often and too long at a time, some pain in the ear is excited. It is to be employed from four to six times daily, about 120 times in a minute, for a minute or a minute and a half, thus bringing about from 600 to 1000 movements in the membrana tympani and the auditory ossicles. [The reporter desires to suggest that in the production of the passive motion in the membrane and the ossicles by this method, and all methods which depend upon the motion in, or of, the meatus and cartilaginous part of the auditory canal, the action of the fascia in front of and just above the tragus, also of that part of the deep temporal fascia extending along the anterior margin of the osseous meatus until lost in the anterior ligament of the auricle, must be taken into account. According to Sexton and Pinkerton,[1] the mem-

[1] New York Medical Record, Nov. 17, 1883.

brana tympani can be made tense by traction on this tissue, especially that part known as the membrana flaccida, which is composed in its outer layer by the skin of the auditory canal, while its inner layer is a reflection of the mucous membrane from the attic of the tympanum. Motion in or traction upon the membrana flaccida would be likely to convey some moving force to the upper parts of the ossicles and thus effect passive motion in these parts.]

Aural Diseases in Diabetes Mellitus.

An endeavor has been made in a few instances of late years, to trace an etiological connection between a form of acute otitis media and diabetes mellitus, in which disease there certainly does occur, now and then, an acute inflammation of the middle ear and mastoid portion, not dependent upon an external course, so far as can be discovered by the most careful search. Such cases of a so-called diabetic otitis media have been reported by Griesinger, 1859; Jordao, 1859; Kulz, 1874; and many others, in both Europe and America.

The one fact which seemed in these cases to warrant the assumption that the aural disease was induced by the diabetes, was that simultaneously disturbances in other organs of special sense, viz., in the sight, were present, which, as has long been known, not unfrequently have an etiological connection with this disease. Schwabach (*Deutsche med. Wochenschrift*, Dec. 24, 1885) has written on this subject, and relates a case of acute otitis media with mastoid disease, which he observed in a diabetic patient, a man, in 1876, and compares it with a case of similar nature and etiology, recorded by Toynbee (1860), and also with the cases of Raynaud (1881) and Kirchner (1884). Schwabach's patient was forty-five years old, and had never been affected by any previous aural malady. Six years previous the diabetic symptoms had first shown themselves, and for a year later the patient had suffered from general furunculosis, an attendant of diabetes mellitus already recorded by others. At the time of the attack of pain in the ear, the sensations of hunger and thirst were not urgent, the polyuria amounted to 2000–2500 cubic centimetres, the sugar in the urine varied from 2 per cent. to 5 per cent., and the specific gravity between 1.027 and 1.030. Dr. Schwabach first saw the patient on the 16th of May, on account of pain in the right ear, which had kept up for twelve days. The pains became much worse at night, were localized chiefly in the mastoid region, and were attended by intense tinnitus aurium and great deafness. Pressure upon the mastoid produced great pain. The auditory canal was very red and slightly swollen; there was also close to the membrana tympani some mucopurulent secretion, and a pulsating reflection in the lower anterior quadrant. After cleansing the canal, the membrana was found to be slightly congested, swollen, very dull, and the ossicles were not easily seen. In the lower anterior quadrant there was a small pinhead perforation. Politzer's inflation forced some purulent secretions from the drum cavity, and the hearing was thereby slightly improved. The pain in the mastoid region was somewhat relieved by the application of two leeches, and ceased entirely in the course of a few days after the continued application of ice poultices. By the 26th of May, the purulent discharge from the ear had almost entirely disappeared under the use of injections of a one per cent. solution of carbolic acid. On the 28th of May, without any known exciting

cause, intense pain set in again in the mastoid region, and the latter became excessively sensitive to the least touch. The skin over this part became red and swollen, but in the auditory canal there was no trace of pus, although the membrana tympani was redder and more swollen than before. The perforation in the lower anterior quadrant was no longer visible. Paracentesis of the membrana was, therefore, performed in the lower posterior quadrant, but very little purulent secretion was removed even by means of Politzer's inflation. Ice poultices were again placed upon the mastoid region, but the pain did not abate. The swelling behind the ear increased, and an œdematous condition of the parts in front of the ear set in, and reached as far as the right upper eyelid. There also ensued right facial paralysis, with pulse 120, and an elevated temperature. Finally, on the 13th of June, the patient consented to the incision of the mastoid, which had been recommended to him some days before. The incision was first made to the bone, which latter was found extensively necrosed, so that merely cutting through the corticalis with the knife sufficed to expose the mastoid cells, and to free a quantity of offensive pus. After all the softened osseous substance was removed by the sharp spoon, the mastoid cavity was washed out with a one per cent. solution of carbolic acid and an antiseptic bandage laid over the wound. The pain was greatly relieved by this operation. The cavity of the mastoid was washed out daily with cleansing washes, and sometimes with a one per cent. solution of carbolic acid. On the 29th of June, fluids injected through the wound into the mastoid cavity passed into the pharynx, and also escaped from the external auditory meatus. Inflation now also produced the well-known whistling sound of passing air, heretofore not heard. The patient did well until July 17th, when beneath the incision in the mastoid, on the side of the neck, there appeared a red swelling, which grew painful and much larger. In three days an incision was made in it, and a large quantity of pus escaped from it. From this time on the patient recovered, as to his ear, almost entirely. The external auditory canal became paler, less swollen, and the membrana tympani, still dulled, contained a small perforation in the lower anterior quadrant. The facial paralysis was much better. On October 8th a small sequestrum was removed from the mastoid fistula, and after that event the process of healing advanced more rapidly. The facial paralysis now disappeared almost entirely, and the perforation in the membrana closed. About this time there ensued a panophthalmitis on the left side, ending in phthisis bulbi. One year and a half later, this patient was treated for gangrene of the left foot, and suppuration in the bones of the leg of same side. In August, 1878, death occurred from cerebral apoplexy, two years after the mastoid operation, no traces of which were seen in the aural region, nor were there any aural symptoms at the time of patient's death. A post-mortem examination of the cranial cavity showed no marked changes over the temporal bone. During the aural disease the sugar in the urine amounted to 4 per cent.; when the gangrene of the foot set in—*i. e.*, one year and a half after the ear disease—2 to 3 per cent.; and, subsequently, till death it was 0.

The most striking circumstance in connection with the case, and with those of Toynbee, Raynaud, and Kirchner, alluded to by the writer, is the suddenness of the otitis as well as the absence of any external exciting cause. Usually an acute otitis is referred by the patient to a general cold or to coryza; but

in these cases, referred to in the article under review, the attacks occurred in individuals carefully watched, in hospitals or their homes, on account of the diabetes.

It is furthermore of interest to note that, notwithstanding the most careful and suitable treatment, the inflammatory process invaded the mastoid portion, and then led to extensive destruction of osseous tissue. The latter symptom never occurs in an ordinary inflammation of the middle ear, unless there is, at the same time, some underlying constitutional taint. Raynaud is disposed to believe that the osteitis is the primary, and the tympanic disease the secondary lesion in these cases, and he refers the bone-disease to the diabetes, in the course of which osteitis is not uncommon. The latter, with anthrax and diffuse phlegmon, diseases tending to gangrene and necrosis of tissue, are to be considered as results of the so-called "inflammatory gangrenous diathesis" (Marchal de Colin) induced by the diabetes. It cannot, however, be shown that osteitis of the mastoid is the usual primary lesion in these cases of so-called diabetic otitis media. In fact, there is every probability that it is not.

The rapid passage of the inflammation from the tympanic cavity to the mastoid process is accounted for by the facts that, 1, in any case there is a ready sympathy between these two portions of the auditory apparatus, and, 2, the resistance of all parts of the body being diminished by the presence of diabetes, the mastoid portion readily yields to the encroachment of disease from the near tympanic cavity. But that an otitis media acuta can run its course favorably, entirely uninfluenced by diabetes already existing in the patient, is demonstrated by a case given in the same paper by Schwabach. If the mastoid is to be operated on at all in these cases, it must be done at the earliest indications.

Cerebral Diseases Produced by Non-traumatic Lesions of the Petrous Bone and Auditory Apparatus.

Under this title Dr. Albert Robin has written a very interesting brochure. (Baillière et fils, Paris, 1883.) He has considered the development of brain diseases in their connection with pathological states of the ear, as they have been recorded in the literature of the subject, and his conclusions are of interest. After a short sketch of the development of the ear, the author sets forth the various ways in which a disease of the brain may result from an aural affection, viz., by direct communication through the thin bony partition, dividing the middle ear from the cerebral space, and also by means of the connection of the aural veins with the middle meningeal, which fact easily accounts for the vertigo, disturbed equilibrium, and involuntary movements. Those aural affections most productive of cerebral disease are the various inflammations of the middle ear, cholesteatoma, otitis externa and interna, the usually secondary tubercular ostitis of the petrous bone, syphilitic ear diseases, and tumors of the aural cavities. The usual results are in the form of meningitis, meningo-encephalitis, hydrocephalus, abscesses, phlebitis of the sinuses and thrombosis, and apoplexy. It is also possible for several brain diseases to be present simultaneously in an individual case. In 200 cases taken from the literature of the subject, meningitis and abscess of the brain were coincident 55 times; meningitis and phlebitis, 28 times; meningitis,

phlebitis, and cerebral abscess, 20 times; meningitis and cerebellar abscess, 14 times; meningitis, cerebral abscess, and phlebitis, 9 times; cerebral abscess and phlebitis, 3 times; meningitis, cerebral and cerebellar abscess, with phlebitis, 1 time; phlebitis alone, 24 times; cerebral abscess alone, 22 times; meningo-encephalitis alone, 20 times; and cerebellar abscess, 4 times. Tuberculosis, scrofula, syphilis, and alcoholism, are considered eminently predisposing factors in the production of cerebral affections. The author also gives an interesting table of the ages of those affected by cerebral disease.

	Meningitis.	Cerebral abscess.	Cerebellar abscess.
5–10 years	11	5	2
11–20 "	48	27	7
21–30 "	36	22	11
31–40 "	18	7	5
41–50 "	3	4	2
51–60 "	2	4	1
Over 60 years	4	4	—

Men are affected twice as often as women by consecutive aural diseases. The length of time elapsing between the occurrence of the ear disease and the affection of the brain, varies between one week and more than forty years. Clinically the author divides these consecutive brain diseases into the latent, by far the most frequent, the fulminant, and the rapid form.—Review by Dr. K. Bürkner, *Archiv f. Ohrenheilkunde.* Bd. 23, pp. 48, 49.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Foreign Body in the Nasal Passages.

Dr. Wm. Porter (*Journ. Amer. Med. Assoc.*, Sept. 26, 1885) reports a case in which the escape of an embryonic tooth into the nasal passages produced a chronic nasopharyngeal catarrh, which underwent cure soon after the spontaneous expulsion of the foreign body.

Aural Disease as a Sequel to Nasal Affections.

Dr. Chas. H. Burnett (*Med. News*, July 25, 1885) concludes that there is a constant causal relation between chronic nasal catarrh and chronic tympanic catarrh, and that this naso-aural disease is found under two forms—hypertrophic and atrophic. Treatment must be directed to the nasal passages. Incidentally, Dr. Burnett mentions two cases of acute otitis media excited by the use of the electric cautery in the nasal passages.

Dr. Beverly Robinson devotes a special chapter in the new edition of

his treatise on *Nasal Catarrh and Allied Diseases*,[1] to "The Aural Complications of Nasal Disease."

Vasomotor Disturbances of the Nasal Passages.

Dr. Wm. C. Glasgow (*New York Med. Journ.*, August 8, 1885) describes three cases illustrating a condition which he at one time considered to be modified hay fever. It occurs, however, at all seasons of the year. The prominent features are great swelling of the cavernous tissue, profuse discharge of limpid fluid, and abnormal pallor of the mucous membrane. The latter condition, he thinks, points to increased constriction, rather than relaxation of the vessels.

Nasal Chancre.

E. Rasori, of Rome (*Gaz. degli Ospitali*, No. 93, 1885; *Int. Centbl. f. Lar., Rhin.*, etc., November, 1885), describes an instance of hard chancre in the right nasal passage, but its exact seat is not indicated. Infection is attributed to digital transportation.

Tonsillotomy.

M. de St. Germain (*Phila. Med. Times*, Aug. 22, 1885) considers this simple operation not devoid of danger, and refuses to perform it if the tonsils do not touch in the median line. The subjects of enlarged tonsils are not any more liable than others to phthisis or diphtheria. In a child under two years of age, the loss of blood, however slight, may weaken the patient. From four years of age up to twelve is the period for operating. From seventeen to nineteen, and in adults, there is risk of hemorrhage, and the physician should remain with the patient at least an hour. During epidemics of diphtheria, operations are dangerous. A concave bistoury, the gland being held with a proper forceps, is considered by St. Germain preferable to the amygdalotome. The compiler has knowledge of a few recent cases of alarming hemorrhage following machine-tonsillotomy in adults. He considers the bistoury the best instrument for excision. When excision is for any reason to be avoided, the electric cautery furnishes a safe, even if tedious, method of reduction.

Caffeine in Laryngeal Phthisis.

Dr. Gougenheim (*Annales*, November, 1885) contributes an important paper, giving the result of his observations on caffeine as a substitute for cocaine in twelve cases. He employs a double salt of caffeine and sodium, the hydrochlorate of the former and the benzoate or salicylate of the latter, in order to produce a neutral solution. It was successful in œdema, less so in spasm, and inefficacious in a case of carcinoma. The relief to dysphagia was very prompt in all cases, but repeated applications were necessary. Even where cocaine had to be used at first, the effect could be maintained by caffeine. The use of caffeine, he thinks, will tend to diminish the abuse of cocaine.

Late Tertiary Syphilis of the Larynx.

Dr. Delie (*Bull. de la Soc. Franç.*, tome ii. f. ii.) supposed, when first called to treat Mademoiselle X., forty-seven years of age, that his patient

[1] New York, 1885; Wm. Wood & Co. See Amer. Journ. Med. Sci., Oct. 1885, p. 493.

suffered with tuberculosis of the larynx. The absence of signs of pulmonary disease, and the rapid amelioration that took place under the local use of iodoform, dispelled that idea, and he finally obtained a history of a primary lesion at eighteen years of age. The patient, ignorant of the nature of the disease, and ashamed to confess her fault, had undergone no treatment.

Chromic Acid in the Nasal Fossæ.

Dr. M. Bresgen, of Frankfort-on-Main (*Rev. Mensuelle*, October, 1885), gives his experience with this agent, which Hering's encomium induced him to employ. He embeds two or three crystals in a cotton wad attached to a silver probe, and places the mass in contact with the mucous membrane at any desired point. The mucus penetrates the cotton and dissolves the acid, which is thus limited in its application, the strength depending on the duration of the contact. Thus employed, he has secured breathing space in an occluded nose, after all other methods had failed. In cases of considerable enlargement, where the cold wire cannot be employed, the galvanocautery is more rapid and the wound longer in cicatrizing than that produced by chromic acid. The latter agent, he thinks, is superior to chromic acid, in all cases accessible to manipulation.

The danger of producing a perforation of the septum by the local employment of chromic acid (which accident the compiler has known to happen) must be borne in mind by all who use this drug in the nasal passages. With proper caution, it is, beyond question, a useful agent.

DERMATOLOGY.

UNDER THE CHARGE OF

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Ichthyol.

Lorenz (*Deutsche med. Wochenschr.*, No. 36, 1885) describes ichthyol, a remedy which has found a place in cutaneous therapeutics. Ichthyol, or, more properly speaking, the salts of ichthyolsulphonic acid, is produced from a mineral oil rich in sulphur, which is obtained from a bituminous calcareous slate. The oil is perfectly translucent, of a brownish-yellow color, and sea-green fluorescence; has a specific gravity of 0.865, and boils between 100° and 225° C. The analysis gives: carbon, 77.25; hydrogen, 10.52; sulphur, 10.72; nitrogen, 1.10. The sulphur is intimately blended with the oil. By treating the oil with concentrated sulphuric acid, a considerable amount of sulphur

and oxygen is supplied, and ichthyolsulphonic acid is obtained. By this means a combination soluble in water and capable of being absorbed is formed, its solubility in water being an important feature from a therapeutic standpoint. Ichthyolsulphonic acid is of a greenish-black color, of syrupy, stringy consistence, with a peculiar sharp odor. Combinations of the acid with sodium, potassium, and ammonium have been obtained, the first two of which form brown, ropy pastes, the last named being more fluid. All three salts are perfectly and easily soluble in water. In diseases of the skin the author, recommends, as vehicles for the drug, water and equal parts of alcohol and ether, and also petroleum ointment.

An Undescribed Disease of the Skin (Gangrene with Keloid).

With this title Doutrelepont (*Monatshefte für praktische Dermatologie*, November, 1885) gives the notes of a singular case. The disease occurred in a strong, buxom woman, twenty-five years of age, a nurse by occupation. On the first of August she stuck herself with a needle under the nail of the thumb. The needle, which gave rise to the formation of pus, was removed. The following day two whitish spots appeared on the first phalanx of the thumb. Gradually like lesions made their appearance over the whole body, accompanied with burning sensations. Some of them became pemphigoid blebs, beneath which, after the gangrenous epidermis had been cast off, a granulating growth manifested itself which passed into keloid. Later, under treatment with corrosive sublimate, the keloidal growth was arrested, the ulcers healing naturally. The lesions were non-symmetrical, and did not begin with erythema. The first impression made upon the observer was that the disease was keloid.

Doutrelepont remarks that such a wound occurring the day before the disease of the skin points strongly to an infection due to the inoculation of some virulent matter, but an examination into the subject gave negative results. Cocci were, as was to be expected, found upon the surface of the gangrenous skin. Some of the whitish patches were excised and hardened in alcohol, and sections showed here and there small aggregations of cocci, but they were more numerous on the surface. The case was regarded as unique.

Sphacelinic Acid in Rosacea.

Unna, the well-known dermatologist of Hamburg, presents a preliminary note on this subject (*Monatshefte für praktische Dermatologie*, November, 1885). He was induced to experiment with it through the article of Kobert, entitled "On the Composition and Action of Ergot," this latter observer being the first to introduce sphacelinic acid, which he regards as the gangrene-producing agent of ergot. An extract rich in this acid, made up in the form of a five or ten per cent. ointment, gave very satisfactory results in *simple uncomplicated* rosacea. Where the disease was secondary to folliculitis, or to acne, the result was far less satisfactory. Moreover, the influence of this ointment in reducing hyperæmia was evident upon other concomitant angiectases, as in lupus, scars, and nævi. The action is painless.

Unna availed himself of the preparations of Gehe & Co., of Dresden, called "Extr. Sec. Cornuti cornutino-sphacelincum," and also of a very active extract containing sphacelinic acid, manufactured by Mielck, of Hamburg.

A New Variety of Tuberculosis of the Skin.

Riehl (*Wiener med. Presse*, November 1, 1885, p. 1394) considers that up to the present date there are three forms of disease of the skin which must be designated tuberculosis. One of these is the miliary tuberculosis, with subacute course, first described by Jarisch, which is to be regarded as true tuberculosis. The two other forms of disease, which are known as scrofuloderma and lupus vulgaris, must also be viewed as tuberculous affections. To these varieties must now be added a fourth, which, according to Riehl, presents itself in the form of rounded, circumscribed, verrucous patches of variable size, localized (in the fifteen cases observed) upon the hands and the anterior third of the forearm, more especially upon the backs of the hands and the extensor surfaces of the fingers, upon one or upon both extremities.

The development of the patches takes place by an erythematous, bright red border forming around a former patch, upon which, in a few days, irregularly distributed minute pustules appear, the erythematous zone at the same time spreading. The pustules dry up, and after the crust has been detached show a slightly uneven brownish or violaceous red surface. In the course of weeks the elevations grow to club-shaped, and pointed papillomata, covered with extensive layers of epithelium. Small pustules still continue to form between the papillary growths, minute drops of pus exuding upon pressure, the whole patch at this period being crusted.

In the course of several weeks involution occurs, pus-formation ceasing entirely; the accumulations now consist chiefly of epithelial layers, and to such an extent as to resemble ichthyosis hystrix. The further retrogression takes place very slowly, the papillomata only after a period of months flattening, losing their horny covering, and being succeeded by superficial, smooth, knitted-looking scars, thus terminating the local process.

The patches, which make their appearance in indefinite number and at various points, increase in size with each relapse, and as the latter usually occurs about the periphery, the lesions assume the form of ragged borders. In large patches the central portion is always much scarred, so that annular and serpiginous tracts are formed. During the entire course of the disease, neither glandular swelling nor impairment of the general health was noted. In one case the disease had existed two years, in another fifteen years, so that the process must be regarded as a chronic one. The youngest patient was nineteen years, the oldest forty-five years of age.

The anatomical examination in seven different cases gave identical results. The bacteriological studies proved the anatomical diagnosis, tubercle bacilli in the giant and epitheloidal cells, as well as in the granulation tissue, being found in all the cases examined.

Riehl proposes for the disease the name "tuberculosis verrucosa cutis." Treatment by means of caustics, excision, and erosion, together with iodoform dressings, gave favorable results.

[The disease depicted by Dr. Riehl seems to be one of the well-known varieties of scrofuloderma as described by Dr. Duhring in the third edition, p. 487, of his *Treatise on Diseases of the Skin*. Whether the manifestation should be regarded as being more appropriately classed under scrofuloderma or tuberculosis for the present must remain an open question.—Eds.]

Treatment of Diseases of the Skin with Resorcin.

M. Ihle, in a practical paper (*Monatshefte für praktische Dermatologie*, Dec. 1885), reports favorable results in a number of cutaneous diseases with resorcin, which he was induced to experiment with from the good account given of this remedy by Dr. Andeer, in the *Monatshefte für prak. Derm.*, Jan. 1884. After referring to the antiseptic properties of resorcin and its value in the treatment of unclean wounds, ulcers, burns, lymphangitis, and lymphadenitis, and for the relief of pain in these affections, the result of its use in seventy-five cases of eczema is given. In acute eczema it cannot be commended, proving in most cases irritating; but in the chronic forms of the disease it worked beneficially in removing the eczematously thickened skin; after which, however, it was found that cure was more speedily accomplished by supplementing the treatment with other remedies, such as Wilkinson's ointment. The resorcin was employed in ointment form, the strength varying from five to fifty per cent.

In the parasitic diseases, tinea tonsurans and tinea sycosis, due to the trichophyton fungus, it acts promptly, and may be regarded as a specific. Fifty-three cases of sycosis and twenty-nine of tinea circinata barbæ were treated, in the greater number of which the presence of the parasite was proved. The specific anti-parasitic action of the remedy is particularly striking in the case of small patches, and in superficial, intact, annular lesions. Already, after two or three applications of a strong ointment, the inflammation subsides, it being necessary to continue the use of the remedy only where the disease has invaded hairy regions. A great advantage in the treatment of tinea sycosis with resorcin is that depilation is not necessary, the hairs being forced out of the follicles by the working in of the remedy. An ointment composed of the purest resorcin 10 parts, paraffine ointment 50 parts, oxide of zinc and starch each 25 parts, is recommended; a pure resorcin and white (not yellow) vaseline (the ungt. paraffini, Pharm. Germ.) being used to avoid a bluish coloration, which otherwise occurs. If the ten per cent. salve is well borne, the strength may soon be increased to twenty-five and later to fifty per cent. Shaving is interdicted during active treatment, the hairs being clipped every few days.

In the kindred diseases, tinea versicolor and so-called eczema marginatum, the same positive results were obtained as in tinea tonsurans and tinea sycosis. The author's experience with tinea favosa was limited, but in one case, that of a child, in which a five per cent. ointment was used, a cure was effected in two months. Good results were also obtained in seborrhœa, *cum defluvio capillorum*, with the following formula: resorcin, 5–10 parts; olei ricini, 45 parts; spirit. vini, 150 parts; bals. peruv., 0.5 part; to be rubbed in daily with a flannel rag. Not only did the fall of hair cease, but the itching was also abated. Cases are cited in which this remedy succeeded where other well-known preparations had failed.

The strong astringent, drying properties of resorcin render it moreover valuable in acuminated warts and in syphilitic flat condyloma. A fifty to eighty per cent. ointment, spread on a cloth and applied fresh daily to such growths, acts most happily. Even on the third day, the upper layers of epithelium become whitish, and begin to be cast off, leaving the growth beneath both smaller and flatter. The application of the ointment is to be repeated, and in

a short time the wart comes down to a level with the skin, when a weaker ointment may be substituted. In these cases, as well as in others where resorcin is used, it may here be mentioned that it is well to protect the surrounding healthy skin in order to prevent irritation. In psoriasis it was also found useful, and may be commended in those cases where chrysarobin and pyrogallic acid are not tolerated. The author considers that no danger need be apprehended from cutaneous absorption. Internally it was not employed.

Resorcin in the Treatment of Epithelioma.

A case of epithelioma is reported (*Giornale internazionale delle scienze mediche*, 7, 1885, p. 575), by Dr. Rubino Antonino, in which a cure was brought about by application of resorcin. The epitheliomatous growth was situated on the side of the nose, being the size of a pea, with considerable surrounding hyperæmia and infiltration. The growth was washed twice daily with a solution of potassium permanganate, and resorcin in the proportion of fifteen parts to twenty of vaseline, kept applied in the intervals. The epitheliomatous tumor gradually disappeared, at the end of five months nothing being seen but an insignificant scar.

Case of Bullous Eruption in a Child.

A bullous eruption in a child of four years, following a few weeks after an attack of measles, is described (*Journ. Cutan. and Ven. Dis.*, November, 1885) by J. H. Ripley. It was preceded by an attack of urticaria, which had lasted, intermittently, a few weeks; and as it was apparently declining, circumscribed areas of dermatitis, variable as to size, appeared on different portions of the body, and developed into bullæ. The palms and scalp were not involved; new lesions continued to form from day to day. At first the contents were clear, later becoming turbid; and as the general condition became reduced, hemorrhage took place — the bullæ rupturing, and disclosing a bleeding surface. Hemorrhage also occurred from the nose, mouth, rectum, and beneath the finger- and toe-nails. The process was active for two weeks, recovery slowly taking place. The patient's general condition during the height of the disease was alarming, the temperature reaching 104° F. Subnitrate of bismuth was applied, and tonics and concentrated foods were given. With the exception of frequent attacks of urticaria in two (out of three) of the other children, and in the patient himself, nothing unusual was disclosed in the family history.

The Action of Unna's Plaster-mulls.

In his observations (*Deutsche medicinische Wochenschrift*, December 17, 1885) L. Hoffman refers especially to the gutta-percha plasters. These have advantages over the salve-muslins (Salbenmulle); they are permanent, adhesive, comfortable, cleanly, and are more active.

The boric acid plaster proved of value in leg ulcers. A new plaster, large enough to cover the hardened border of the ulcer, was applied daily; later, after the surrounding parts had become somewhat softened, it was applied to the ulcer only. The ulcer became gradually smaller, the last part being

healed by a weak nitrate of silver ointment. Four cases are given, in all of which the result was favorable. In the treatment of bedsores this plaster also acted admirably.

Chrysarobin plaster (18 per cent. strength) gave excellent results in psoriasis. In its use there was no danger of the chrysarobin-conjunctivitis; and the erythema produced by the drug did not extend beyond the parts covered with the plaster.

In several cases of eczema in which the disease was dry and circumscribed, oxide of zinc plaster was employed and effected rapid cures. In the more severe forms the zinc and tar plaster was found efficacious. In obstinate cases naphthol plaster (ten per cent. strength) was tried with satisfactory effects. This last plaster proved useful also in a case of beginning lichen ruber.

Salicylic acid plasters are recommended for the treatment of infiltrated patches of eczema, also in verrucous and sclerous patches. This plaster also acts well in epidermal hypertrophies, as clavus and callositas. In clavus salicylic acid and mercury plaster is preferred on account of its being less painful. Salicylic acid plasters were found of value in the vegetable parasitic diseases, also in lupus and acne rosacea. The pain that the stronger salicylic acid plasters sooner or later give rise to, may be moderated by the use of those containing fifteen per cent. of extract of cannabis indica.

The mercury and carbolic acid plaster gave good results in furuncles. It acts differently according to the stage of the lesion. If applied in the beginning, the furuncle is aborted; if suppuration has set in, the same continues, but the process is painless. The frequency of renewal of fresh plaster depends upon the amount of suppuration. This plaster acts equally well in other phlegmonous inflammations.

Ethereal Solution of Caoutchouc.

This solution Biart (*Journ. Cutan. and Ven. Dis.*, December, 1885) prefers to the liquor gutta-perchæ, as the ether is less irritating than chloroform; and it is preferable to collodion as this latter is not so elastic. A quantity of the solution mixed with ointments and spread upon muslin, the writer states, makes a good adhesive dressing.

Alopecia Areata and Bacterium Decalvans.

Sehlen has found (*Centralblatt für klinische Med.*, December 5, 1885) a micrococcus in the hair roots in alopecia areata. The writer succeeded in producing areas of baldness in animals by inoculations with the organism, a pure culture of which having been successfully obtained.

The Treatment of Chilblains.

According to Meurisse (*Journal des Sciences Méd. de Lille*, November 20, 1885) chilblains may be relieved by local baths of sulphuric acid and water—a liquor-glass of the former to a quart of the latter. Ulceration is no contra-indication. The baths, lasting about ten minutes, are employed twice daily.

The Later Advances in the Therapeutics of Skin Diseases.

In a practical paper Unna gives (*Medicinisch-Chirurgischer Centralblatt*, Wien, October 30, November 27, 1885) a *résumé* of the progress made in cutaneous therapeutics during later years. Among the various remedies brought forward, and which have apparently established claims to permanency, may be mentioned salicylic acid, the ichthyol preparations, calx sulphurata, resorcin, and cocaine.

Salicylic acid is especially valuable for its action in removing the normal or thickened horny layer, and for this purpose is best applied in the form of a plaster (salicylplastermull,[1] 5.0, 10.0, 20.0—50.0 gr. pro Rolle). Thickened, infiltrated patches of eczema, psoriasis patches, and lupus infiltration will yield much more readily to the ordinary remedies, if the corneous layer of the epidermis is first acted upon by a salicylic acid plaster. This remedy has the advantage of confining its action to the horny layer alone, and hence there is no danger of producing vesiculation or bullæ, as will sometimes happen when corrosive sublimate and similar drugs are employed. The action of the acid is not corrosive, but the "salicylated" corneous layer is usually cast off as a soft, whitish membrane. In addition to this action of salicylic acid, it sometimes has a favorable effect, if continuously applied, in reducing infiltration, such as lupus deposits, etc. An advantage which the drug also possesses is its compatibility with ordinary remedies, with the exception of alkalies and soaps.

The value of sulpho-ichthyol-ammonium lies in its high proportion of sulphur, its ready solubility in water, and its harmlessness. It has a favorable effect in pityriasis, seborrhœa sicca, ichthyosis, and also in the desquamation following acute exanthemata. In mild cases of psoriasis, also, its action is recognized. While the ordinary sulphur preparations must in eczema always be prescribed with caution, this compound may be added (in the proportion of about two per cent.) to the usual applications in this disease, always without fear of aggravating the disease, and almost invariably with good effect. The influence of the remedy, especially when given internally (for adults, fifteen grains daily; for children, three to seven grains), is seen in eczemas of nervous origin. The principal claim of the ichthyol salts, however, is their action, when applied locally, in acne and acne rosacea.

Calx sulphurata is valuable in interstitial suppuration, especially if given in the beginning. The dose varies from one-fifteenth to one-sixth of a grain, three or four times daily.

Resorcin has a recognized antiseptic value, and has proven useful in those diseases for which the ichthyol salts have been mentioned. Its lack of odor gives it some superiority over the latter preparations. It is not so harmless, however, and hence in universal and chronic skin diseases its use requires caution. It is especially valuable in those cases of eczema occurring about the eyelids, lips, and nasal orifices. It is applied as a ten to thirty per cent. salve or muslin plaster (Salbenmull).

Cocaine proves valuable in the form of a one per cent. solution or salve, in eczematous fissures of the anus and nipples; it should be applied frequently.

[1] Manufactured by Beiersdorff, an apothecary of Hamburg.

As regards the advance in the treatment of individual diseases, it may be said of lupus, that so far nothing has proven so useful as the curette, thoroughly employed, and followed by a caustic application. The diseased areas are to be scraped out, and then a caustic, such as nitrate of silver, chloride of zinc, etc., be carefully applied; or, better, the application of a concentrated solution of pyrogallic acid. Or pencilling the part with a pure ichthyol salt two or three times daily, may be employed. If more active cauterization is required, application of a ten to twenty per cent. pyrogallic acid salve may be used. For deeper cauterization muslin plasters of arsenic and mercury, pyrogallic acid, salicylic acid, salicylic acid and mercury, iodoform, salicylic acid and iodoform, iodide of lead, mercury, and carbolic acid. These plasters are applied to the scraped-out areas. If the curette is objected to, or for any other reason cannot be used, then the best method consists of the application of a strong salicylic acid plaster to act upon the horny layer of the epidermis, to be followed by one or more of the above-named plasters, until cure has taken place. Punctate and linear scarifications are not advised, for reason of the possibility of constitutional infection. The combined method of punctate scarification and injection of an antiseptic, however, is not, for known reasons, open to the same danger. Among the remedies which may be injected may be mentioned a fifty per cent. solution of ichthyol, with or without the addition of tincture of iodine; a ten per cent. solution of pyrogallic acid; a two to five per cent. solution of potash; and a five per cent. solution of creasote.

In regard to the treatment of furuncles, carbuncles, abscesses, etc., an experience of five years has taught the writer that early treatment will frequently abort the process; or at all events have a remarkably favorable influence. The remedy which gave these results is the mercury and carbolic acid muslin-plaster. The application, in addition to the favorable effects mentioned, has a marked influence on the pain. In those cases where pus collects beneath the plaster, the latter is removed, the pus allowed to dry, and the same or a new plaster applied. If convenient, a linseed poultice may be put on over the plaster. The practice of incising furuncles and carbuncles has, with rare exception, no advantages. On hairy regions, or where the plaster cannot be conveniently applied, the author recommends the application, twice daily, of a ten per cent. ichthyol salve. The best remedy for internal use in these affections is calx sulphurata, in doses of about a sixth of a grain, three times daily.

In erysipelas, applications of pyrogallic acid, resorcin, and the ichthyol salts are useful. They are applied in the form of ointments or plasters — the ichthyol salts, 20 to 50 per cent. strength; resorcin, 10 to 20 per cent.; pyrogallic acid, 5 per cent.

Pemphigus (Contagiosa?).

A case of bullous disease (*Lancet*, January 16, 1886, p. 140) is reported by F. Sturges. The patient was a child seven days old, one of a family of six. The eruption appeared especially about the face, fingers, feet, and finally upon the thighs. The bullæ were tense; and, if ruptured, disclosed a surface appearing as a superficial burn. The general health was not affected. Under simple treatment complete recovery took place in between two and three

weeks. The affection also developed in four of the other children, and in the father and nurse, in all of whom, however, with one exception, the fingers were chiefly attacked. [The clinical features and course of the disease taken together lead to the conclusion that the cases described could be classified as examples of impetigo contagiosa.—REP.]

REMARKS ON LICHEN PLANUS.

WEYL considers (*Deutsche med. Wochenschrift*, No. 36, 1885) the fact that lichen planus is met with on the glans penis, as well as upon the mucous membrane of the mouth, etc., as indicating the improbability of the disease holding any relationship to the hair-follicles or the sweat-glands. The first changes, as noted by the microscope, are hyperæmia and a downward extension of the rete. In consequence of this downward pressure the underlying papillæ are destroyed; the characteristic dell of the papule is thus produced. The white points which can be picked out of lichen patches are due to a local increase in the granular cells of the mucous layer; the color of the papules is due to venous hyperæmia. The itching of the disease is best controlled by an alcohol and glycerine solution (½ per cent.) of naphthol.

A CASE OF DYSIDROSIS OF THE FACE.

Under this title G. T. JACKSON (*Journ. Cutan. and Ven. Dis.*, January, 1886) reports a case of a cook, aged forty-three, in whom the face was the seat of vesicular lesions, appearing as large and small sago grains scattered over that region. The lesions varied in size from a pinhead to a small split-pea, showed no tendency to rupture, and presented a tolerably tough and thick covering. The affection had persisted for five years, being much more marked in summer weather.

LANOLIN—A NEW OINTMENT BASE.

LIEBREICH (*Berl. klin. Wochenschrift*, 47, 1885) brings forward lanolin for an ointment base. It consists of a mixture of cholesterin fat (obtained from keratin-holding tissues, as sheep's wool, nails, etc.) and water. Pure cholesterin fat holds a middle position between a resin and a fat, but is capable of taking up its own bulk of water. This ointment base is neutral, easily absorbed, and is tolerably permanent. Its unctuous character may be better preserved by the addition of five or ten per cent. of ordinary fat or glycerine.

SOME OF THE USES OF PYROGALLIC ACID IN DERMATOLOGY, AND THE DANGERS ATTENDING ITS APPLICATION.

The contribution of C. W. ALLEN (*Journ. Cutan. and Ven. Dis.*, January, 1886), under this caption, contains much of practical value. The author's experience with it in the treatment of lupus, although confessedly limited, has been satisfactory. It is especially valuable in those cases where the disease is returning in the cicatrix resulting from previous treatment, "seeking out" the individual nodules and leaving the healthy tissue and scar unchanged. It has the great advantage of being painless, or comparatively so. Several

cases of lupus vulgaris and one of lupus erythematosus, in which the remedy was used, are given in detail. In these cases the plans of application of the acid were as a powder, ointment, solution in collodion, or solution in liquor gutta-perchæ. The method of application by ointment for several days, to be followed by mercurial plaster, as recommended by Schwimmer, is favored.

In the treatment of chancroids the author prefers dusting the part with pure acid the first day, and the following day, after removing any crusts, painting on a solution (ten per cent.) in collodion. The application of the pure acid gives rise to momentary pain, but it is not severe. Healthy action is established in a few days, and the parts are subsequently treated with iodoform, black wash, or other dressing. In a case of tylosis of the feet, in which the ordinary methods of treatment had failed, application of a solution of pyrogallic acid in liquor gutta-perchæ, a drachm to the ounce, was followed by good results.

The dangers from the use of pyrogallic acid are both constitutional and local. The several cases of poisoning heretofore reported are quoted, and show that a single application to extensive surfaces has even a fatal effect, and, on the other hand, that poisonous symptoms are noted only after a more or less prolonged use of the drug. As a precaution, it is advisable not to apply the remedy over extended surfaces at a time, and that at first, especially in new cases, a mild ointment should be used. As to the unfavorable local effects on healthy skin, the literature furnishes nothing except passing reference to a dermatitis or erythema. It is generally supposed that the normal skin is not affected by the acid, and to a great extent this is true, but the contrary occurs, as the writer's experience shows, nor could the exceptional action be attributed to the acid used. Two illustrative cases (psoriasis) are given. In one a palm-sized patch on the thigh was treated with a ten per cent. ointment. For a week there was marked improvement, but a week later the tissues for an inch beyond the border of the patch were blackened and charred, and the surrounding skin much inflamed. A simple ointment was ordered, but an ulceration of the skin about the patch developed, and was slow in healing.

In the second case a ten per cent. ointment was applied for a week to a patch upon the leg, at the end of which time the patch became black and hardened, and the surrounding skin, for about an inch beyond, blistered. Soothing applications were made, under which, after the charred tissues had sloughed off, healing took place, leaving a disfiguring cicatrix. In several instances of lupus and epithelioma, strong applications destroyed cicatricial tissue. Occasionally, after the acid has been applied for a varying period, pain and inflammatory swelling are noted; in such cases its use should be intermitted.

In prescribing it with animal fats, the ointment should be freshly prepared at short intervals, as, owing to its deoxidizing property, such fats are readily decomposed, and then become irritating. In psoriasis good results were obtained by using collodion containing forty grains of the acid and ten drops of castor oil to the ounce. The author concludes "that its application is not without dangers, both to the general system and to the body's healthy surface," and "that it is capable of producing death in the one case and extensive sloughing in the other."

A Case of Multiple Sarcoma of the Skin.

An example of this disease is reported by Cheever (*Boston Medical and Surgical Journal*, January 14, 1885). The patient was a female, aged sixty-five. The lesions began as pinkish nodules, freely movable on the deeper tissue, and were at first confined, without order or symmetry, to the extremities. Subsequently all parts of the body, except the head, were invaded. As the nodules increased in size, exfoliation, moderate in amount, of fine, silvery-white scales, was noted. Ulceration began on the surface of the lesion, at the centre, about the time they had attained the diameter of an inch; and under the crust, which was yellowish or greenish-brown in color, the ulceration progressed, at the same time the nodule grew laterally. The final resulting ulceration varied from one and a half to three inches across. The nodules were not sensitive or painful, and but few of the ulcers were attended with pain, and this was slight in character. The patient was nervous and depressed, but otherwise in good general health. Later the ulcers healed, except the smallest with the border of elevated new growth; this border of new growth in some lesions showed a tendency to disappear by absorption. A few months later new lesions were noticed, and the patient's health began to fail. About this time the case was seen by Dr. J. C. White, and Fowler's solution ordered. A number of the former nodules, however, had been absorbed, some in their entirety, others not completely, crescentic ridges being left. From one of these ridges on the right forearm grew a thick nodule, with a thin, red, exfoliating epidermis, and several small veins coursing over it. Later some of the tumors enlarged and fused together; so the process continued. The tumors and ulcers increased both in size and numbers. At the date of death, which took place from gradual loss of strength, eleven months from the beginning of the disease, there were about two hundred lesions, in various stages of development. Microscopic examination of the growth, which was made several weeks before death, showed it to be a small spindle-cell sarcoma.

MIDWIFERY.

UNDER THE CHARGE OF

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Congenital Lateral Deviations of the Womb in their Relation to Circumuterine Tumors and the Mechanism of Delivery.

Congenital lateral deviations of the uterus are so often met with, and so manifestly influence the development of various periuterine pathological conditions, and also the mechanism of parturition, that they deserve to be closely and attentively studied. Professor J. Lazarewitch, in an able article in the *Ann. de Gynec.*, July, 1885, p. 1, points out that, as a rule, the

womb is not placed exactly in the centre of the true pelvis, but is found more or less approximated to one of its walls. These congenital deviations depend usually on some congenital difference in the development of the uterine ligaments and of the vaginal wall—thus *the congenital retroposition of the uterus* depends on shortening of the sacrouterine ligaments. In this position of the womb we may easily have:

(1) Anteversion and anteflexion.

(2) Location of tumors behind and above the body of the uterus.

(3) During pregnancy and delivery, deviation of the cervix backward and upward, and saccular dilatation of the anterior wall of the lower uterine segment.

(4) After confinement very marked anteversion and anteflexion of the uterus.

The congenital anteposition of the womb depends on shortening of the anterior wall of the vagina. In this position there is a liability to:

(1) Version and flexion of the womb backward.

(2) The location of tumors in front of the uterus.

(3) During pregnancy and delivery, deviation of the cervix forward and upward, and saccular dilatation of the posterior wall of the lower uterine segment.

The congenital lateropositions, right or left, of the uterus, depend either on want of development of the broad ligament, the ligament of the ovary, and the uterosacral ligament, or on want of development of the vaginal wall on the side on which the womb is most closely approximated to the pelvic wall. Lateroposition of the uterus tends to:

(1) Lateroversion or lateroflexion of the organ.

(2) The location of tumors behind or before the uterus.

(3) Lateroversion of the uterus and unilateral saccular dilatation of the lower uterine segment during pregnancy and delivery.

(4) Lateroversion of the womb after confinement.

Out of 1000 cases examined, the womb held the median position in 599, the left lateral in 359, and the right lateral in 42; M. Bernutz, out of 229 cases examined, found lateral deviations and lateral versions in 62. Lateral positions are either congenital, and in that case unchanging and constant, or acquired, in which case they are accidental and not permanent. We have said that these deviations are due either to shortening of the broad ligaments, or to want of length in the lateral part of the vaginal wall; in these latter cases the fornix of the vagina on the affected side is more shallow than on the opposite side, and the vaginal portion of the womb cannot be displaced from the lateral wall of the pelvis to which it is approximated, but in the former cases the vaginal fornix on the affected side is duly elevated, and the vaginal portion of the uterus may be drawn toward the median line of the pelvis whilst the fundus retains its abnormal position. Dr. Freund believes these congenital lateral deviations to depend on the position of the rectum; Kölliker has met with them in the autopsies of young infants.

According to gynecologists, lateropositions and lateroversions are of no importance, and are due to the displacement by tumors, pelvic inflammations, and such like causes; for his own part, Dr. Lazarewitch has noted frequent left lateral deviation in healthy virgins. He has observed deviation to persist

during pregnancy and after parturition, and has found preëxisting malpositions unaltered and unchanged, in spite of the presence and even after the disappearance of various tumors and effusions; if, however, the lateroposition is of pathological production, and not congenital, its persistence is by no means so constant. Tumors developing above the peritoneum of the pelvic cavity do not affect the congenital median or lateral positions of the womb, but subperitoneal growths are liable to displace the uterus.

The diagnosis of lateral deviation presents no difficulty, the height and width of the lateral vaginal arches should be compared, evidence of atrophy or undue fixity should be sought for in the vaginal roof on either side of the cervix, and the position of the cervix, as seen through a Cusco's speculum, should be carefully noted. In many cases of congenital lateroposition Dr. Lazarewitch has observed that on the side toward which deviation has taken place there is want of development in the breast, the nipple, and the areola, and that the same is often true of the labia minora and even majora; moreover, in several cases there has been imperfect development of the whole organism attended by chlorosis, dysmenorrhœa, flexion of the womb, and sterility. In lateral deviations a marked degree of version or flexion, forward or backward, is, owing to the proximity of the pelvic walls, improbable; when it occurs, the difficulty is best met by a pessary with a wide upper extremity, in preference to the oblique form suggested by Dr. Schultze. If the lateral deviation of the uterus is well marked, the utero-sacral ligaments assume an oblique direction, the rectovaginal cul-de-sac becomes distorted, and the ovary on the side from which the womb is displaced is liable to become prolapsed, while that on the side toward which the uterus has deviated is found displaced outward and upward. Under these circumstances the prolapsed ovary may become swollen, hypertrophied, tender, and accessible to touch *per vaginam;* to rectify this morbid condition, the patient ought to be kept in a position of lateral pronation with the pelvis slightly raised on a pillow.

If now we take into consideration this change in the position of the ovary, due to congenital lateral deviation of the womb, we can understand that cysts formed in these ovaries must have different relations with the uterus; it is, however, a false notion to suppose that an ovary, while undergoing cystic degeneration, displaces the uterus to the side opposite to that formerly occupied. The cyst which grows from the ovary belonging to the side where the periuterine space is the more extensive, possesses usually the longer pedicle; and, as a rule, the position of this cyst is behind the womb; on the contrary, the tumor which springs from the ovary belonging to the side on which the periuterine space is more limited, has a short pedicle, and in its growth leaves the uterus beneath it free. From the foregoing we are enabled to judge in most cases to which of the two ovaries the cyst belongs, and what is the length of its pedicle.

Hæmatoceles, pyoceles, and all the various tumors formed in the intraperitoneal space, as well as cystic tumors, leave the position of the uterus exclusively dependent on the relative length of the two broad ligaments and the lateral walls of the vagina. Dr. Lazarewitch is convinced that if the tumor is developed even in the wall of the uterus, the latter keeps the same lateral position it had before the formation of the growth.

Congenital lateral deviation of the uterus in pregnancy may prove the cause

of various morbid conditions, and even favor abortion; moreover, in pregnant women the lateral position predisposes to lateral version, especially in multiparæ. Undoubtedly lateroversion as well as lateroposition exercises an unfavorable influence on the mechanism of parturition, and this influence is not always the same. In lateropositions the uterus preserves the normal direction of its axis, and its expulsive forces, acting in the direction of the pelvic axis, do not meet with opposing force from the lateral walls of the pelvis, but they do not act on the os, rather they are directed against one of the lateral walls, of the lower uterine segment, and this latter, yielding, assumes a saccular form. In lateroversions the gravid uterus preserves in its lower segment the regular form, but it changes the direction of its axis, and the expulsive forces, while acting equally on the two sides of the lower uterine segment, meet with resistance from one of the lateral walls of the pelvis. As a result of the above, one may easily understand that delayed dilatation of the cervix, irregularity in the pains, extreme exhaustion, and rupture of one of the lips of the external os are prone to arise in cases where lateropositions or lateroversions are present. In cases of lateroversion or lateroposition the labor should be carefully watched, and prompt recourse had to mechanical help, if need arise; lateroversion of the gravid uterus can be easily corrected by placing the woman on the side opposite to that one on which the fundus is lying, or, if she be confined on her back, by pushing up the uterus with one or both hands on the side toward which it is bent. When there is lateral deviation of the womb, change of position and pressure are not sufficient, but it is necessary to introduce the finger into the vagina, take hold of the edge of the os externum, and draw it toward the axis of the pelvis; dilatation, as a rule, soon follows. The fundus of the gravid uterus is often in a condition of lateral version when lateroposition of the cervix uteri exists from birth; in these cases it is not sufficient to correct the direction of the uterine axis, but the position of the mouth of the womb must be rectified also. Lateral deviations and lateroversions of the gravid uterus are in many cases so many causes of dystocia, and then simple mechanical manipulations afford evident relief. One interesting point may be noted, viz., that when the cervix is placed in an extreme degree of lateral deviation, the dilatation of the os may be transverse.

On the Relation of the Axis of the Uterus to that of the Pelvic Inlet.

Küstner (*Zeitsch. f. Geb. u. Gyn.*, xi. p. 326) embodies the results of observations made to determine accurately the above relation. Until we discovered a method of ascertaining the direction of the plane of the pelvic inlet to within a few degrees, in addition to the direction of the uterine axis, we were obliged to be content with approximate estimates as to their relation. Now, owing to Schultze's ingenuity, we are able to measure the inclination of the pubospinous plane (that in which the iliac spines and the top of the symphysis lie), and from it obtain the plane of the inlet, since they are found on an average to form an angle of 37° with each other.

In order to obtain the relation which is indicated in the heading of this paper, the author proceeded as follows: The pregnant woman was placed close to a wall covered with a sheet of paper, and her profile (especially that of the

middle part of the body) carefully drawn. On this profile of the abdominal wall the highest spot reached by the uterus was marked, and also the upper edge of the symphysis. Moreover, the inclination of the pubo-spinous plane was measured in that posture in which the outline had been drawn. She was then laid on a horizontal table, the anterior profile drawn, and in it the highest point to which the uterus reached, and the upper limit of the symphysis were indicated. The position of the uterus, whether median or not, the presentation of the child, and the thickness of the abdominal walls were also noted.

To these outlines next was added the line of the pubo-spinous plane, and on making with it an angle of 37° the direction of the plane of the inlet was obtained. Thus, so far as relates to the uterus, we have in the drawing of the fundus the spot at which the anterior wall touched the symphysis and the convexity of the anterior uterine wall. Assuming (what is true within slight limits of error) that the posterior has a similar profile, we can complete the whole outline of the uterus. The axis of the latter was next added, and also that of the pelvic inlet, the angle at which these two lines intersect giving the required relation.

The two axes, when the woman is erect, are found either to coincide, or that of the uterus falls slightly behind the other, forming with it an angle of about 8°. This relation, however, varies with posture. When the woman is supine the pregnant uterus falls back, forming an angle which varies from a maximum of 24° to a minimum of 0°; in the latter case the uterus had undergone a rotation to the right, taking up an oblique position, and causing not only no recession of the abdominal walls, but a slight projection. The average angle in the horizontal posture between the axis of the pelvic inlet and that of the uterus, which lies behind it, is probably about 19°. Various factors influence the degree in which the position of the uterus is altered; *e. g.*, pendulous abdomen.

One object in these investigations was to define the relation between the axis of the uterus and that of the plane of the pelvis, as far as they concern the position of the presenting part, especially the first stage in the mechanism of labor in cephalic presentations. Naegele's belief in the obliquity of the head was founded on the view that the axis of the uterus formed an angle with the axis of the plane of the uterus open toward the front. But as it is now shown that the condition upon which Naegele's obliquity depends does not exist for the generality of cases, the peculiarity in the position of the fœtal head founded upon it may be dismissed.

The interesting question arises as to how far the relation of the axis of the uterus is connected with the various cranial positions. The result of Küstner's observations to determine this question shows that the cranial position does not directly and necessarily depend on the direction of the uterine axis; abnormal positions certainly do not so depend; and thus the whole basis upon which the teaching of Naegele's obliquity was founded—viz., a false conception of the direction of the axis of the uterus—is destroyed.

Conclusions.—1. The axis of the uterus and that of the plane of the pelvic inlet in a well-made, erect woman, advanced in pregnancy, usually coincide.

2. Any deviation of the former takes place oftener backward than forward.

3. In a recumbent position, the uterine axis is usually behind that of the pelvic inlet.

4. The fact of the axis of the uterus being in front of, or behind that, of the pelvic inlet, provided the angle is but small, has no important influence over the main stages of the mechanism of labor.

5. Conclusions 1 and 2 destroy the foundation on which the existence of Naegele's obliquity is based.

6. As pregnant women usually occupy the dorsal position, No. 3 gives the usual relation of the axes.

7. Abnormal cranial presentations (such as those in which one or other parietal bone presents at the brim) are not necessarily and directly connected with the direction of the uterine axis.

Pernicious Vomiting of Pregnancy.

It has recently been shown that in normal pregnancy the great glands of the body, such as the liver and kidneys, undergo what is known by pathologists as cloudy swelling, changes which are almost identical with the first stage of the acute fatty degeneration of Bright's disease, and of acute yellow atrophy of the liver. Probably the natural or physiological vomiting of pregnancy has some causal relation with this altered state of nutrition. But if to this be added the influence of some exciting cause (concerning the precise nature of which, authors are not at present agreed), the change proceeds further and passes into acute fatty degeneration, with the production of eclampsia, or the pernicious vomiting of pregnancy, according as the brunt of the disease falls upon the kidneys or upon the liver. The following case, reported by Dr. E. W. Roughton (*Lancet*, September 5, 1885), illustrates many of the clinical features of this affection.

A primipara, æt. twenty, last menstruated at end of November. A month later she began to suffer from sickness; at first only in the morning, 8 A.M. till 11 A.M., but in January the sickness became more severe, commencing at 2 A.M. and lasting all the morning. She brought up everything she took. From February till she came under observation on April 16th, the vomiting was almost continuous. She was then much emaciated and looked very ill; her face wore an aspect of anxiety and gave evidence of great suffering, the conjunctivæ were slightly jaundiced, but hardly any bile-pigment could be recognized in the skin. She stated that her bowels were usually much constipated, but that she had sometimes noticed her motions to be loose and black, There were no physical signs of hepatic disease. Temperature normal; heart and lungs healthy; uterus presented normal characters of five months' gestation; urine contained trace of albumen and some bile-pigment, but no casts were discovered nor any evidence of the presence of leucin or tyrosin. She was ordered to be fed on iced milk and soda water, and to take an effervescing mixture of citrate of potash. On April 18th, she was much better, had only vomited twice, had kept down a considerable quantity of milk, and had slept fairly well; but at 6.30 P.M. her mental condition became suddenly changed, she commenced to shout at the top of her voice and to throw her arms about violently. This hysteroid attack lasted a few minutes and was followed by an interval of calm, during which she seemed quite confused, talked unintelligi-

bly, and would not answer when spoken to. Had a second attack ten minutes afterward exactly resembling the first. A draught of chloral and bromide of potassium was administered, after which she remained quiet and was rather more collected until midnight, when she had another similar attack, after which she remained in a semi-delirious state, but could be temporarily brought to consciousness. At 3 A.M. on April 19th it was determined to induce miscarriage, and a laminaria tent was introduced into the cervix. As she continued to show a tendency to be convulsed, she was kept partly under the influence of chloroform. Labor terminated naturally at 7.30 P.M. There was considerable post-partum hemorrhage, liquor amnii contained bile, and the fœtus was natural. Consciousness returned five or six hours after delivery, and she became quite rational. She made an uninterrupted recovery, but urine of low specific gravity was passed in large quantities, and remained bile-stained for four days after the miscarriage.

Position during Parturition in Ancient Rome.

Dr. E. J. Miles, of Brighton, draws attention (*British Medical Journal*, Sept. 26, 1885) to the marble sarcophagi lately discovered at Rome, which, on the best authority, are considered to be the work of the third century A. D., or earlier. On the most beautiful one are depicted scenes representing the triumph of Bacchus. The left hand corner of the frieze is devoted to details connected with the birth of Bacchus. The scene represents the moment immediately following the birth of the infant god. The goddess-mother, Semele, is lying on her left side on a bed or couch, in an attitude of exhaustion, with her hands and arms hanging helplessly over the side of the couch, and immediately beneath them a basin of similar shape to the ordinary English ewer. Immediately behind is seen the accoucheur (a female), about to hand the newly born god to an attendant, and close at hand are the figures of other female attendants. Mercury stands close to the head of Semele's couch. All the interest of the bystanders appears to be concentrated in the babe, while the mother, as is, indeed, too often observed in the present day, is lying altogether unnoticed.

Uterine Inertia during the Period of Expulsion in Primiparæ; its Causes and Treatment.

Uterine inertia during the period of expulsion in primiparæ is one of the commonest complications met with. It is often attributed to the exhaustion of the patient which prevents her bearing down any longer, but Ahlfeld (*Deutsche med. Woch.*, Dec. 17, 1885) thinks that the inertia is much more often due to the fact that by the time the presenting part has approached the vulva, the uterus has undergone so much retraction, and has therefore lost so much of its expelling power, that it is unable to overcome even a small obstruction, such as that presented by the perineum and undilated vulvar fissure. Indeed at this stage of labor it is not rare for only a half, or even a third, of the child to lie in the contracting portion (owing to the retraction), which must therefore obviously work at a great disadvantage.

Ahlfeld has tried to demonstrate the small amount of energy retained by the uterus, by the time the fœtus has reached the perineum, by means of mano-

metric experiments carried out in cases of pelvic end presentations. As soon as the os uteri had fully dilated, he introduced into the anus of the fœtus a small India-rubber ball, pushing it up till it reached the sigmoid flexure. This ball was connected with a manometer and a recording drum. Ahlfeld, in one of his experiments, found that while the child was still within the os, the manometer indicated a pressure of 64 mm. (2.5 in.) during the interval between two pains; but as the presenting part advanced, the pressure upon it fell, and by the time the breech reached the perineum, had sunk to 29 mm. (1.2 in.). After this the force of the uterine contractions was practically nil, so that further progress depended entirely on the action of the abdominal muscles. The fall from 64 to 29 mm. (and from these should be subtracted 20 mm. or 0.8 inch, due to the elasticity of the ball itself) showed that the lower part of the fœtal body was exposed to quite an insignificant amount of pressure.

Ahlfeld believes that a part of the so-called uterine inertia in primiparæ is due to the limited agency of the abdominal muscles. These muscles in women generally will have a greater influence on the uterus the more they and the distended uterus bulge forward; and this bulging is admittedly less in primithan in multi-paræ. Especially is it so in primiparæ with but a slight degree of pelvic inclination; indeed, in such women the abdominal muscles may scarcely present any convexity at all; consequently their effect on parturition will be almost nil. Of course other influences may also cause delay in the expulsive stage, but Ahlfeld makes the following suggestions for treatment in cases in which the above-mentioned causes are the active ones.

The first thing is to assist the abdominal muscles in acting vigorously, and this may be done by directing and encouraging the woman to fix her body and limbs in such a way as to enable the abdominal muscles to act as effectually as possible. Two other procedures may also be used: 1st, two fingers may be introduced into the dilated anus, with a view of pressing the head toward the outlet, especially during the intervals between the pains; 2d, a kind of improvised labor-stool may be employed. Such a one can be arranged by placing two chairs close to one another, so that one hind leg of one chair is in contact with that of the other, while the corresponding front legs are slightly separated. If the woman is seated on two such chairs with her thighs separated, the abdominal muscles will in most cases begin to act more energetically, and as soon as the head is seen to advance the woman may be carried back to bed.

In these cases of inertia most accoucheurs are only too ready to resort to the forceps, but if the above suggestions are adopted, it will often render the forceps superfluous, an end which it is desirable to attain whenever possible.

Some other phenomena connected with parturition can be satisfactorily explained by the peculiar relations which the uterus, when in large measure emptied, bears to the child during the last stage of its progress. For instance, the contracting uterus is sometimes so greatly diminished in size that the supply of oxygenated blood to the child is insufficient, and the latter dies from asphyxia. Nature indeed has done something to prevent this, by causing the area of placental insertion to contract much less than the rest of the uterus. But in spite of such provision, excessive retraction may cause the death of the fœtus. This is often the cause of death in those cases in which a child which had got as far as the perineum, and whose heart at that stage could be heard beating regularly, is born dead a quarter or half an hour later.

Oxygen in Eclampsia.

Reimann, in *Centralbl. f. Gyn.*, December 5, 1885, summarizes five recently published cases of eclampsia in which the treatment by oxygen inhalations was adopted. Two out of the five died, while in one of those that recovered the oxygen was quite useless. In the other two cases of recovery, the eclampsia set in during the post-partum period, and it is always in such that the prognosis is most favorable. Reimann thinks the evidence justifies the opinion that oxygen is no better than the numerous other remedies that have been tried for this disease. It seems, however, to have a somewhat beneficial influence on the coma and on the respiratory affections, and may therefore be used as a palliative. Reimann thinks that most good may be expected from remedies which stimulate cutaneous activity, and has repeatedly seen good result from the cold pack.

Remarkable Case of Pelvic Deformity; Rupture of Uterus; Cæsarean Section.

Dr. Eugene De Saint Moulin reports (*Journal d'Accouchements*, July 30, 1885, p. 161) a very interesting case, of which the following is an abstract:

Juliette D., at the age of sixteen, was struck on the lower part of the back by a large mass of stone, which knocked her down and literally crushed her. Removed to the hospital, she had to keep her bed three months, during which time she had involuntary evacuations of the bowels and incontinence of urine, preceded by retention. At the end of three months she had regained control over the bowels, but the incontinence of urine continued. At the end of six months she could walk with the help of crutches, and at the end of a year the incontinence was cured and locomotion was easier and more certain. On leaving the hospital there was still some deviation of the vertebral column, and her walk was halting; the patient before the accident had been quite free from any trace of rickets or osseous deformity.

Five years later, in 1877, she entered the lying-in department of Mons for her confinement; the following is the description of her pelvis as ascertained at that time: On making a vaginal examination the exploring finger impinges almost immediately on the promontory, which projects considerably into the cavity of the pelvis and is slightly deflected to the left. The pelvic cavity is deep, and a projecting crest arises from the internal surface of the symphysis pubis. Pelvic measurement gives for the antero-posterior diameter of the inlet three centimetres and six millimetres (1¼ inches), for the left sacrocotyloid diameter three centimetres (1¼ inches), and for the right sacrocotyloidean diameter four centimetres (1½ inches). The pelvic contraction being so considerable, Dr. Pichuè decided to perform Cæsarean section, and met with complete success.

In January, 1884, Juliette D. entered the Maternity of Brussels; she stated herself to be seven months pregnant, and had felt fœtal movements for the last three months. Her age was twenty-eight, her height 55.3 inches. At the lower part of the back toward the base of the sacrum, in the point corresponding to the sacrovertebral angle, was a considerable hollow, which had a depth of 1⅞ inches; the curvature of the sacrum was abnormal, but the other parts of the skeleton were normal. The belly was pendulous, and

the uterus seemed to be developed in a sort of pouch, which projected in the fashion of a hernia outside the abdominal cavity, and hung in front of the thighs as low down as the knees. On raising the abdomen the skin was seen to be sloughing between the umbilicus and the pubis, and at this point fluctuation was perceptible. Next day, after having passed a bad night, the patient complained of severe abdominal pain, the features were pale and drawn, the pulse was 132 per minute, temperature 37.5° C. (99.5° Fahr.), and respiration 40 per minute; the abdomen was distended, and the patient vomited everything ingested. The sufferer lay in a half somnolent condition, interrupted now and then by cries of pain and vomiting; any attempt to raise the belly caused pain, the extremities were cold and cyanosed, and the fœtal heart-sounds no longer to be heard. At the lower part of the abdominal sac fluctuation was very distinct. Diagnosis being doubtful, it was decided to wait. On January 11th the symptoms of depression were less, and for the next few days the patient continued to improve slightly.

On January 16th, operation was decided upon, but without chloroform, as the patient's state seemed scarcely to justify its use. The abdominal wall having been incised in the middle line, the operator came at once upon a mass of numerous dark clots, which was removed with the hand; having cleared these out, the bag of the amnion became visible, protruding through a rent in the uterus. The diagnosis was at once clear: the uterus, weakened by the cicatrix left by the previous Cæsarean section, had given way at that point, and the resulting hemorrhage, limited by some old peritoneal adhesions, had become encysted and gradually ceased; the sac of the amnion had remained intact, but the fœtus had succumbed. After having opened the bag of waters, Dr. Moulin enlarged the rent in the uterus, rapidly removed the fœtus and placenta, and secured good uterine contraction. The lips of the uterine wound were brought together with catgut sutures, and the abdominal incision having been similarly secured, and a drainage tube inserted at its lower angle, the patient was put back to bed. The whole operation was conducted under strict Listerian precautions. For ten days all went well and there seemed a fair chance of recovery, but on January 26th epigastric pains set in, followed by extreme prostration; the pulse-rate rose to 144, general shivering and cold sweats followed, and in spite of every attempt at restoration she sank gradually into a state of syncope and died.

Description of the Pelvis.—At the first glance, one is struck by the marked projection in front of the vertebral column; this is so close to the symphysis pubis that it projects beyond the imaginary line of the transverse diameter of the inlet. The sacrum is doubled up; its anterior surface forms an acute angle, the apex of which is at the back and measures 45 degrees. The articular facet of the sacrum with the last lumbar vertebra looks directly forward, as does also the tip of the coccyx; these two points are only 4 centimetres (1.57 inches) apart. Looking from behind, one notices that the upper part of the sacrum and the lower part of the vertebral column are, as it were, sunk in. The incurving of the lumbar vertebræ is so marked that their spines, especially those of the second, third, and fourth, overlap each other, the sacroiliac ligaments are lengthened, and there is a gaping of the left sacroiliac articulation. The articular surface of the left wing of the sacrum is detached from the corresponding surface of the ilium,

while the transverse apophysis of the fifth lumbar vertebra is broken through. An osseous mass of new formation has consolidated these parts, but their mutual relations are completely modified; by the intervention of a voluminous mass of callus the sacrum and the fifth lumbar vertebra are soldered together on this side, and the sacroiliac articulation is ankylosed. The articular surface of the left lateral mass of the sacrum has sunk so as to make a projection of at least 2 centimetres (0.78 inch) into the great sciatic notch; as a consequence, the border of the left wing of the sacrum no longer assists in forming the innominate line, but its place is taken by the edge of the synostosis consequent on the fracture of the transverse apophysis of the fifth lumbar vertebra. On the right side the sacroiliac articulation has held firm, but the wing of the sacrum has been broken toward its middle part; the osseous union following has left this wing elongated, twisted, and slightly thickened.

The vertebral column has been displaced forward to such a degree that the last two lumbar vertebræ project into the pelvic cavity below the plane of the pelvic inlet. The brim of the pelvis, instead of being limited posteriorly by the promontory, is limited by the slightly projecting lower border of the third lumbar vertebra, and the distance between the centre of this border and the upper part of the symphysis pubis measures only 3.8 centimetres (1.49 inches), while curiously the distance between the lower part of the symphysis and the same part of the vertebral column equals 7.3 centimetres (2.87 inches). The lumbar part of the spine is slightly deflected to the left, thus the distance from the right iliopectineal eminence to the lower border of the third lumbar vertebra is 44 millimetres (1.73 inches), while on the left it is only 35 (1.37 inches). The lower border of the symphysis pubis is distant 11 centimetres (4.33 inches) from the sacrococcygeal articulation; the tuberosities of the ischia are 9 centimetres (3.54 inches) apart. Owing to the disturbed relations of the sacrum and iliac bones, the posterior and upper borders of the latter have become displaced backward, and, as a consequence, rupture of the symphysis pubis has occurred. The whole results of the tremendous injury done to the pelvis seem to have centred in the sacrum and fifth lumbar vertebra; the sacro-lumbar articulation has remained intact, but the second sacral vertebra is crushed, and has permitted the first sacral vertebra to slip down in front of it and become soldered by its lower border to the upper edge of the third sacral vertebra. The following measurements were obtained, viz.: Diameter of Baudelocque, 16 centimetres (5.29 inches); distance between the anterior and superior iliac spines, 23 centimetres (9.05 inches); distance between the posterior and superior iliac spines, 10 centimetres (3.93 inches); distance between the trochanters, 27 centimetres (10.62 inches).

Kilian, Herrgott, and recently Neugebauer, Jr., have described a variety of pelvic deformity in some respects resembling the one in question, and to their descriptions reference may profitably be made, but on examining the subject it is plain that the pelvis just described is neither the spondylolisthesic variety of Kilian nor the spondylizematic pelvis of Herrgott; there is in this case neither slipping of the vertebral column in front of the sacrum, nor caries, either of the body or of the vertebral arch. We have really to deal with a fracture of the sacrum complicated by left sacroiliac dislocation,

in consequence of which the vertebral column *en masse* has sunk down into the pelvic cavity. Under these circumstances we are justified in considering the present pelvic deformity as a special variety, to which we shall give the name of *pelvis obtecta*, adding, as the mode of origin, *due to fracture and dislocation of the sacrum.*

PARTIAL INVERSION OF THE UTERUS DUE TO SHORTNESS OF THE CORD.

DYHRENFURTH relates such a case in the *Centralb. f. Gyn.*, Dec. 19, 1885. The patient was a Mrs. G., 5-para; four normal confinements. Dyhrenfurth, on being summoned to attend her, found that the liquor amnii had been discharged five days before; child in the second vertex position; fœtal heart audible on the right side. The uterus was somewhat sensitive and firmly contracted round the fœtus, the head of the latter lying above the brim of the pelvis. Vaginal examination showed that the cervical canal was not fully dilated; well-marked caput succedaneum. Dyhrenfurth gave some morphia, which caused the patient to sleep soundly. Twenty-four hours later strong pains came on, and Dyhrenfurth found the head low down in the pelvis, the lips of the os retracted, and a very large tense anterior fontanelle presenting; sutures wide, cranial bones very thin, showing a slight degree of hydrocephalus. Fœtal heart-sounds no longer audible; caput succedaneum flaccid. Dyhrenfurth perforated at the great fontanelle, and attempted to extract the head with the cranioclast; the cranial bones, however, were so thin and fragile that the cranioclast would not hold, and he was obliged to remove the whole vertex of the skull. Even then the head refused to descend, owing to the shoulders remaining above the pelvic brim; vigorous efforts, however, succeeded after a while in dragging the shoulders through the pelvis, when the remainder of the trunk followed without difficulty. Dyhrenfurth then sought to place his hand on the fundus uteri, but could not feel it, even on vigorously rubbing the abdominal walls. At the same time he noticed severe hemorrhage, and the nurse informed him that the umbilical cord was torn off. Dyhrenfurth at once introduced his disengaged hand into the vagina, and finding the placenta in the latter he removed it. Behind this, and within the external os, lay the partially inverted uterus, the placental area on the anterior wall. Dyhrenfurth replaced the fundus without any difficulty and injected several pints of cold water into the uterus, which soon became firmly contracted, when the hemorrhage ceased.

Inspection of the child and of the after-birth revealed the following remarkable facts: The cord was torn through obliquely at a point about 5 cm. (0.2 inch) from its insertion into the navel, while the portion adhering to the placenta was only 3 cm. long (1.2 inches); in other respects it was normal. The lying-in period passed off naturally, except for some bronchitis and considerable tenderness of the hypogastrium.

Dyhrenfurth believes that the shortness of the cord prevented the shoulders from descending into the pelvis, and that when he forcibly dragged them down, the placenta, which was still firmly adherent, inverted the uterus, causing the cord to tear through.

The funnel formed by the inversion could be distinctly felt during reposition. Dyhrenfurth also points out that the placenta was inserted on the anterior wall, and not on the fundus, while it is generally believed that it is

when the placenta is inserted into the fundus that traction on the cord is specially liable to produce inversion.

In Cases of Version should the Fœtus be Immediately Extracted?

Winter discusses this question in the *Zeitsch. f. Geb. u. Gyn.*, 1886, p. 153. After pointing out the various procedures that have been in favor at different epochs, he expresses his conviction that in cases of uncomplicated transverse presentation, it is best to wait till the os uteri is fully dilated, than to turn and extract the fœtus at once. He disapproves of turning immediately that the case is diagnosed as a transverse one, because delay, in his experience, is not nearly so injurious as is generally believed. On the other hand, no interval should be allowed between version and artificial or spontaneous delivery, since such delay greatly damages the prognosis for the child. The above conclusions are based on the results of three hundred and ten cases of simple uncomplicated transverse presentations.

When a transverse presentation is diagnosed, the bag of membranes being still entire, it is admitted to be best for both mother and child to delay the version until the os is completely dilated.

Again, if the liquor amnii has been discharged before version, the latter should be at once performed if the cervix is completely dilated. Delay is useless.

But if the membranes burst just as the os is beginning to dilate the condition is a very serious one, and every aspect of the case should be considered before interfering. Winter, after carefully examining all the conditions, holds that there is no danger either to mother or child involved in waiting till the os dilates fully. The reason for which delay was formerly condemned was the fear—

1. That the fœtus would die in utero;
2. That delay would render version more difficult.

Both these events undoubtedly occur under some conditions, but Winter considers that they will not appear if the accoucheur merely waits till the os has dilated; that they occur only during the later stages of neglected transverse presentations.

When, in transverse presentations, the membranes rupture early, almost all the liquor amnii flows out, and the uterus becomes closely applied to the ovoid fœtal mass (whether pains are present or not). This condition, however, does not interfere either with the placental or uterine circulation, nor does it cause compression of the umbilical cord, though so many statements to the contrary have been made. In Winter's series of cases, the membranes ruptured early in 203, and in 17 of them the child remained for from 6 to 18 hours in the uterus without any bad symptoms whatever. Moreover, Winter himself has seen 24 cases of early rupture of the membranes with contracted pelvis, in which the child remained between 1 and 96 hours in the uterus without any liquor amnii; in only one case did the child die *in utero*, after rupture of the membranes, without apparent cause.

It follows, therefore, that premature discharge of the liquor amnii in itself scarcely affects the child. There is, however, a condition secondary to it which may set in at any moment and prove rapidly fatal, viz., tympanites

uteri. As soon as air enters the uterus, the prognosis becomes bad for the child; out of ninety-four cases collected by Stande and Hofmeier, only six remained alive. The cause of the mortality is not quite clear, but it is very probable, as Preuschen suggests, that the premature admission of air excites respiratery movements which induce changes in the circulation, and lead to the death of the fœtus. The danger is, indeed, so great that the question arises whether the complication is so frequent and unavoidable that the dread of it is a sufficient reason for avoiding any delay after rupture. On this point Winter concludes that, though in many respects the conditions here referred to are favorable for the entrance of air, yet, if the lying-in woman be kept very quiet on her back, no unnecessary examinations being made, the complication will be extremely rare, so much so that it will not justify an interference which otherwise is undesirable. Indeed, in Winter's cases there were only four of uterine tympanites.

Winter next discusses the possibility of septic mischief setting in as a consequence of premature rupture of the membranes, and the usually coexisting inertia; but he saw it well marked in only 8 out of his 310 cases, and only in 5 of these did he attribute it to the prolonged labor.

This is so very small a proportion as not to justify an interference that is otherwise uncalled for, especially as the pyrexia has no effect on the child, and even the mother generally does well. Moreover, by means of antiseptics, most cases of pyrexia can be entirely prevented.

Inertia of the uterus in transverse presentations, with premature rupture of the membranes, is a source of danger to neither mother nor fœtus, though precautions should be taken to avoid uterine tympanites and septic pyrexia.

Should, however, strong pains come on after premature rupture of the membranes, there is a risk of the child dying *in utero* through the arrest of the placental circulation. Hence it is clear that as soon as the os has dilated the child should be turned and extracted, so as to remove it from its position of danger.

The question, however, arises, What is the influence of strong pains on the fœtus before dilatation of the os? Can they be fatal to the fœtus, or endanger it so much that it succumbs to version or extraction?

Winter replies that the pains under these conditions are not strong enough to kill the child; the fatal result which has so often been observed depends on the proper moment for interference (*i. e.*, the moment the os is fully dilated) having been missed.

Another danger to the life of the fœtus arises from tetanus uteri, which diminishes the supply of oxygen to the fœtus. Tetanus uteri, however, according to Winter, is a well-defined occurrence, which is always due to definite avoidable causes—*e. g.*, ergot, or unsuccessful attempts at version; and, if these causes are avoidable, tetanus uteri affords no argument for doing what is otherwise not good for the child. Winter concludes, therefore, that the fear of the fœtus dying while the os is becoming dilated is totally unfounded.

The impression that version was rendered more difficult through delay has had a yet stronger influence on the doctrine that early version is desirable. There are three distinct conditions by which it is alleged that the difficulty may be increased.

a. A state of passive uterine contraction in which the uterus is closely applied to the fœtus.

b. Tetanus uteri.

c. Delayed transverse presentation, with a deep impaction of the presenting part, and an associated cervical stretching tending to rupture of the uterus.

For these reasons it is argued that version should be performed as early as possible. Winter, however, considers that all three conditions come into operation, not if the dilatation of the os is merely waited for, but only when a case of transverse presentation is neglected beyond that period. As regards the first of them (*a*), so long as there are no pains, the fœtus may remain in the uterus without any injury, and the version is not made more difficult to any appreciable extent. If pains set in, they will rapidly cause dilatation of the os, and any tenseness of the uterine wall that may exist will be easily overcome if the patient is completely anæsthetized.

Objection (*b*) relates to the so-called persistent spasmodic contraction of the uterus which occurs in neglected transverse presentations. Winter believes that, though a very dangerous complication, it will not occur under careful treatment—that is, during the period of dilatation. Its causes are excessive doses of ergot, or unsuccessful or severe obstetrical operations.

The third point (*c*) relates to the stretching of the "lower uterine segment," and is of great importance.

Here, again, Winter considers that waiting till the os is fully dilated does no harm, and that any difficulties arising from the above are due to the right moment having been missed.

On all these grounds Winter concludes that in uncomplicated transverse presentations the right treatment is not to turn immediately on making the diagnosis, but only when the os has become fully dilated.

Winter next discusses the question whether the child should be extracted immediately after version. This course was naturally not possible so long as version was performed before the os was dilated. But granted that version should be postponed till dilatation has taken place, should extraction follow at once?

Winter expresses himself strongly against Zweifel's view that the placental respiration of the child is greatly endangered by the operation of version, and that it is best to allow it to recover before being exposed to the further risks of extraction. In Winter's 236 cases of version (with a dilated os) followed by immediate extraction, only 5 children were extracted dead; while out of 27 cases in which version was performed before the os was dilated, and in which either labor was allowed to go on naturally or in which extraction was done later, 13 children died.

The causes which make it dangerous to delay in extracting a child which has been turned, are the great risk which the cord runs of being compressed during version, and the not infrequent entrance of air during difficult versions. The latter event is dangerous both to mother and child—to mother, because it leads to septic mischief; to child, through exciting respiratory movements, with which are associated circulatory changes that often prove fatal. Most dangerous of all, however, is the detachment of the placenta which so often accompanies or follows version.

Winter sums up his results as follows:

(1) The doctrine that version and extraction should never be practised immediately, one after the other, arose from the false assumption that the prognosis in artificial foot presentations (produced by version) was as bad as in the ordinary ones.

(2) The formerly universal practice of turning as soon as possible after rupture of the membranes, was due to the dread of the fœtus dying *in utero*, and of the version becoming more difficult if delayed.

(3) The fœtus does not die in consequence of early rupture of the membranes, but only if tympanites uteri or extremely strong pains or tetanus uteri are superadded.

(4) Version is not rendered more difficult by waiting for the os to dilate, and in normal cases the child passes safely through the operations of turning and immediate extraction.

(5) Delay in extracting a child that has been turned is highly dangerous to it; some children die *in utero;* some may still be preserved if extraction is rapidly performed, even after some delay has occurred.

(6) Whether the membranes are ruptured or not, version must be deferred till extraction can follow immediately upon it; very distinct indications alone may call for a departure from this rule.

On Expression of the After-coming Head.

Koppe, in the *Centralblatt für Gynäkologie* of Sept. 26, 1885, suggests a procedure somewhat different from that usually adopted for expressing the after-coming head in pelvic presentations. He points out that the pressure which is exerted on the head in a direction perpendicular to the pelvic inlet tends to flatten that part of it which is lying above the brim, and thus necessarily leads to an increase in all the diameters which run parallel to the brim. In other words, the usual mode of applying pressure causes an increase of the very part of the head (*i. e.*, the diameters which are parallel to the brim) which was already too large to pass through the pelvic cavity before the pressure was applied. This must necessitate the use of additional force to cause the head to pass, and cannot but be injurious both to mother and child. Koppe, to avoid the difficulty, and in order to diminish the diameter imparted in the conjugate, instead of increasing it (as occurs in the ordinary method), has adopted the following plan with good success:

After seeing that the bladder is empty, and making sure that the antero-posterior diameter of the head is lying pretty nearly in the transverse diameter of the pelvis (bringing it into that position if not there already), he gives the body of the child to the nurse, directing her to hold it according to the Prague method and in the proper position for the extraction. The accoucheur now approximates as much as possible the thenar and hypothenar eminences of one hand, places it immediately above the symphysis, and forcibly presses the projecting part of the fœtal head against the last lumbar vertebra. In difficult cases he may support his elbow against his body in order to obtain greater power. After thus exerting a constant pressure for some seconds, the diameter of the head in which the pressure is applied becomes smaller, the bones gliding over one another at their sutures. In many cases

the compressed head gives a distinct sensation of yielding to the pressure. It is at this moment that expression or expression combined with traction on the trunk can be most favorably used for delivering the child. The free hand, usually the right, is placed flat over the vertex of the skull in the direction of its sagittal diameter, and strong pressure is applied in a direction perpendicular to the brim while the full lateral pressure is still kept up. At the same time the nurse should pull vigorously on the trunk. The head is now felt slowly to yield and to sink into the pelvic cavity, the accoucheur then seizes the body of the child in order to deliver the head as quickly as possible. In unusually difficult cases, an assistant may press upon the hand of the accoucheur so as to increase the pressure. One advantage of this procedure is that the compression of one diameter of the skull caused by it, is simply what occurs in normal labor. But what nature takes hours to do, is accomplished artificially in less than a minute. The diminution in the diameter of the skull corresponding to the c. v. must of course be accompanied by an elongation in the other diameters, but as the transverse diameter of the pelvis measures two cm. more than the c. v. this does not usually cause any difficulty.

Extraction of an After-coming Head.

The *Centralblatt f. Gyn.*, Nov. 7, 1885, contains a paper by Freudenberg, entitled "Extraction of an after-coming head," in which he admits the value of the method of expression recommended by Koppe, while maintaining in opposition to the latter, that when expression fails the forceps may be of great use. Koppe adduces two objections against the use of the forceps: 1. Its application involves a waste of time when every minute is important. Freudenberg replies that they can be applied in two minutes or not much more time than is consumed by the catheterization required before Koppe's methed of expression can be practised; further, supposing that out of the twelve or thirteen minutes within which the head must be got through consistent with the life of the child, five are allowed for expression, there is abundance of time left for the forceps. 2. The forceps is applied in the transverse diameter of the pelvis, and by compressing the diameter of the head in which the blades lie, causes an increase in all the other diameters. Fraudenberg admits that in principle this is true, but points out that as a matter of fact the forceps exert far more traction than compression, as is shown by the frequency with which the head rotates, while still within the forceps, without the latter rotating. Hence this argument of Koppe's is insufficient to cause a rejection of the forceps.

Freudenberg grants that Koppe's modification of the expression method may be of some value, though actual experience must settle the degree of utility. His method, however, is only available when the sagittal diameter runs transversely in the pelvis, and even in these cases it is questionable whether the usual means (traction from below, force of pains) do not exert as much compression as is safe.

When the head lies other than transversely Koppe's procedure is unavailable, but the forceps may be of great service in rectifying such malposition. Further, there are cases in which expression does not succeed in delivering. In such we have to decide, not between forceps and expression, but between

forceps and perforation. Koppe has therefore gone too far in rejecting the forceps entirely in the delivery of an after-coming head.

The Application of the Forceps to an After-coming Head.

Lomer, in *Zeitschr. f. Geb. u. Gyn.*, 1886, p. 111, contributes an article on the above subject. After briefly summarizing the two rival views, 1st, that maintained by Schröder, who holds that it is a useless procedure to apply the forceps to an after-coming head, and 2d, that of Credé, who argues that the application of the forceps in such conditions may sometimes be useful, he declares his conviction, based on an experience of three cases, that Credé's view is the true one. Indeed, Lomer believes that in every one of his three cases the forceps was the means of saving the life of the child. On one occasion he attended a multipara in whom he found the second vertex position, with prolapse of the left hand and arm. The liquor amnii had been discharged three hours before; os fully dilated. Lomer performed version and extraction, the latter succeeding readily till the head was reached. Child was a very large one. Lomer as well as his assistant pulled hard, one at the shoulder the other at the lower jaw, but without being able to deliver the head. Abdominal expression was also tried and failed. Lomer thought the child was dead, and applied the forceps. With its help the head could be felt to yield, and on being extracted was found to be above the average size. After a good deal of trouble the child was brought back to life.

Lomer admits that such cases must be exceptional, and in a great many perforation will be the only wise procedure; on the other hand, in ordinary cases extraction by manipulation will readily succeed and be the best procedure. Nevertheless the forceps is of value in some cases of an after-coming head, and must not be entirely discarded.

When Should the Umbilical Cord be Tied?

Engel (*Centralbl. f. Gyn.*, November 14, 1885), after introductory remarks as to previous observations, describes some investigations of his own made with a view of settling the above question. He followed Schücking's procedure—*i. e.*, weighed the child twice; first immediately after delivery, and again when the cord had ceased to pulsate and become pale and collapsed. The latter point is important, inasmuch as the vein continues to transmit blood (to the extent of about 10 grammes) after pulsation in the arteries has ceased. Engel weighed 60 children in this way, 24 being premature. The greatest increase in weight shown by the second weighing amounted to 70 grammes in a child at the full time, in a premature child to 90. In the latter he found the pulsation generally lasted longer. It follows from this that the child gets more blood when the cord is ligatured late.

Engel next deals with the questions, What is the cause of this physiological transfusion, and what is its value to the child? As regards the first question there is difference of opinion, some ascribe it to thoracic aspiration, others to the force of the uterine contractions during the third stage of labor. There are several reasons against aspiration being the only cause. 1. A more or less considerable increase in weight may take place before the child begins to breathe—*i. e.*, while aspiration is still inactive. 2. If aspiration were the

cause of the transfusion, the latter would be slight during the first minutes before respiration is fully established and increased afterward, whereas the exact opposite is found to be the case.

That the uterine contractions are not active in producing the transfusion is shown by the fact that such transfusion is greatest immediately after the expulsion of the child—*i. e.*, at a time when the uterus is quiescent and uncontracted and the placenta not compressed.

It is natural to suppose that the cause of the circulation through the cord is the same after the birth of the child as during its intrauterine life—*i. e.*, cardiac activity. Thus in cases of severe asphyxia, in which the heart's action is very feeble, the cord does not pulsate and no circulation though it takes place. In healthy children, however, the heart pumps the blood to the placenta and allows its return through the vein. It is, however, not the cardiac activity which causes the increased supply of blood to the child. Here the agent is the greater contractility of the arteries by which the blood is squeezed onward owing to their contracting before the vein, the latter also remains patent longest.

The quantity of blood which the newborn child gains when the cord is tied late, and which amounts to from one-fourth to one-third of the whole of its blood, must have a physiological meaning; and seeing how sensitive newborn children are to the loss of even small quantities of blood—*e. g.*, during circumcision, etc.—early or late ligaturing must be expected to have an important influence. Such an influence is seen in the more rosy color of the skin and the quieter demeanor where late ligaturing is practised; such children look more mature, begin to suck later, cry less, and sleep more. Icterus infantum also is rarer.

As regards the decrease in the weight of the infant, which usually occurs after normal labor, Engel could not show any connection between early or late ligaturing and such decrease. Late ligaturing of the cord had, however, in his experience, an important influence over the mortality of newborn, and especially of premature children. In his Maternity, during four years in which early ligaturing was the custom, 90 premature children were born (measuring 44–47 cm. in length); 18.88 per cent. died within ten days.

During the next four years in which the cord was not ligatured till it had ceased to pulsate, 74 premature children were born, of which 9.45 per cent. died within ten days.

How Should a Doctor Cleanse His Hands?

The *Centralb. f. klin. Med.*, 1885, No. 18, contains a paper by Forster (Amsterdam) on the above subject. The author directed his pupils to investigate by experimental methods what was the best method of sterilizing their hands to which, of course, under ordinary circumstances, more or less bacteria-containing dust would be adherent. Every possible disinfectant was subjected to trial, and in the following way: A single finger was first thoroughly cleansed in the disinfectant under trial, and then dipped in a sterilized neutral or feebly alkaline peptonized meat infusion. With every disinfectant except one, after from twenty-four to sixty hours, some form or other of schizomycetes appeared, which was then examined both in regard to

its naked-eye characters and also microscopically. Washing with 2.5 per cent. carbolic acid was not sufficient to sterilize the hands; nothing but a solution of corrosive sublimate—0.5 and 1:1000—succeeded in sterilizing them so completely that no cultivations of bacteria could be obtained from them, even when the most sensitive nutrient medium was employed.

Puerperal Endocarditis, with Hemiplegia, after Delivery.

Under the above heading, Dr. Wm. C. Neville instances (*Dublin Journ. Med. Sci.*, Aug. 1885, p. 112) the case of a 7-para attended by left hemiplegia on the morning after delivery. As the patient was sitting up in bed she suddenly felt giddy, fell back, and was convulsed. The convulsions were of a transitory character. There was complete loss of motion on the left side, with transient rigidity and almost complete anæsthesia; some slight reflex movements, however, could be obtained. The left side of the face was paralyzed, and head and eyes turned toward right side. Left pupil dilated, but both responded to light. Right limbs, which for a day or two at the outset were subject to frequent choreiform movements, could be moved at will, and attained sensibility. It was possible to rouse patient from state of partial insensibility, but though capable of uttering certain words, she was at first quite unable to give any articulate reply to questions which she apparently understood. In a few hours the aphasia passed off, and she complained of severe pain in the left side of the head, and a few days afterwards of constant pains in the left ankle and up the left leg. Bladder emptied itself naturally; urine not albuminous, no casts. Temperature, normal at first, rose to 101.4° F. on evening of eighth day, and patient continued slightly feverish till death occurred on evening of sixteenth day after delivery. Respiration, slow and labored at first, became hurried toward end. Pulse, weak and irregular for first few days, became weaker and more frequent subsequently. On the fourth day after delivery it was noted that the heart was acting irregularly at times; the aortic sounds were both indistinct, and faint aortic regurgitant and obstructive murmurs were heard. Second sound louder over pulmonary artery. Radial pulse visible and jerky, especially so on the right side. Patient died semi-comatose, with lividity of face and extremities, heart's action for six hours previously having been very irregular and weak, and severe angina-like pains complained of. No sign of pelvic mischief throughout, and patient continued to suckle child till supply of milk diminished on the occurrence of a rise of temperature.

Autopsy revealed slight excess of pericardial fluid. Large heart, thickly coated with fat, right side dilated, and substance somewhat pale; left ventricle hypertrophied and of better color. Clots, probably ante-mortem, in both auricles, another in left ventricle more characteristically ante-mortem. Aortic valve incompetent and slightly atheromatous, one presenting a small conical vegetation, with vascular and abraded apex, evidently of recent origin. Other valves healthy. On opening dura mater considerable amount of semi-turbid fluid found upon both sides, more especially beneath arachnoid. Right carotid occluded by embolus, extending some distance along middle cerebral artery. Right middle lobe of brain much softened. Slight amount of purulent-looking fluid in right lateral ventricle. Optic thalamus and corpus

striatum soft and pulpy upon right side, markedly contrasting with the healthy condition of these bodies on opposite side. Uterus well involuted. Other organs presented no morbid characters worthy of note.

This patient had never suffered from rheumatic fever, nor from any of the more usual causes of heart trouble, nor complained of any symptoms specially referable to the heart during pregnancy. She is stated to have suffered from some form of eclamptic attack, attended with insensibility, a few days after the birth of her last child, but recovered perfectly.

In commenting upon this case, Dr. Neville remarks that the altered condition of the blood and vascular system generally of the pregnant woman tends, not only toward the intensification of chronic endocarditis, but also to the production of endocardial inflammation *de novo*, either with or without preëxisting pyæmic lesions, and often of a malignant type. In this way, he suggests that some of those rare examples of the so-called "puerperal fever" arising during the last weeks of pregnancy, without any recognizable means of hetero-septis, may be accounted for—that they may really have been cases of this quickly fatal form of septic endocarditis.

Moreover, he points out that this affection is especially liable to occur in patients whose nervous systems are for some reason depressed, and it is also possible that in this may be found the well-known predisposition of unmarried primiparæ to suffer from the various kinds of septic diseases of childbed.

In many of the cases of embolic hemiplegia previously recorded, and verified by post-mortem examination, the lesion appears to have arisen in consequence of the ulcerative form of endocarditis. In the case, however, now recorded, the history and the post-mortem appearances prove, with sufficient clearness, that the embolus arose in consequence of an acute or subacute endocarditis, originating during the latter months of pregnancy, and affecting one only, and that an aortic, valve. The aortic lesion certainly appeared to be quite recent in origin, though for a year previous to her confinement the patient had suffered unusual hardships and privation—of itself a sufficient cause of endocarditis, apart altogether from pregnancy, or any of its more generally recognized causes. That the hemiplegia was due to organic lesion of the brain, the result of embolism, is sufficiently proved by the post-mortem examination; and it is probable that many of those cases of paralysis during pregnancy and the puerperal state, formerly referred to hysteria, direct pressure on pelvic nerves, albuminuria, apoplexies, and various other hypotheses, may have been due to a similar cause. Death seems to have resulted from failure of the fatty heart to carry on the circulation, and from the largeness of the cerebral area in which nutrition was suddenly arrested.

The Glycosuria of Lactation.

As the result of a series of observations, Dr. Sinclair (*The Medical Chronicle*, January, 1886, p. 276) regards the glycosuria of lactation ("galactosuria") as a physiological phenomenon due to the resorption of milk in engorged breasts. The milk-sugar, possibly in a slightly altered form, is excreted by the kidneys.

When to such urine yeast is added, fermentation does not occur except to a very limited extent, unless the specimen has been previously boiled with sulphuric acid.

With Fehling's solution reduction takes place, sometimes immediately, sometimes after a considerable interval. Moreover, the amount and character of the precipitate is subject to considerable variation. Sometimes there may be observed a peculiar play of color, a sort of opalescence, an absence of precipitation or filtrability, and other peculiarities which have not so far been explained and are not referable to the reducing power of simple milk-sugar. On these grounds the presence, in addition to the milk-sugar, of some saccharine substance either free or in some combination, appears probable.

After the first engorgement of the breasts the amount of sugar, as indicated by Fehling's test, varies unaccountably, and sometimes it continues to show its presence intermittently for a long time.

These sugar-containing urines vary in specific gravity up to 1.037. Urines of specific gravity below 1.020 reduce the Fehling's solution only after boiling for some minutes. The amount of solid matter and of urea is found to be relatively increased in the samples in which sugar is present. The increase in the organic matter is not accounted for by the amount of urea, but it seems probable that even if the casein and fat of the milk do not appear unchanged in the urine, yet their equivalents may be excreted in some form. They may in future correct analysis be found among the constituents of urine.

What practical bearing galactosuria may have on the healing of wounds is a point for further observation.

Dr. Sinclair considers that the milk drawn by an infant from overdistended breasts, being deprived by partial resorption of sugar and salts, and doubtless also a portion of the water, is too rich in casein and butter, and is in consequence apt to disagree.

The observations would have been more valuable if they had been contrasted with others in which the flow of milk was diminished or arrested without engorgement of the breasts. It has been noted that sugar has appeared in the urine under these circumstances, irrespectively of engorgement.

GYNECOLOGY.

Malignant Diseases of the Ovary.

The *Zeitschrift f. Geb. u. Gyn.*, 1885, p. 14, contains a paper by Cohn on this subject, viewed from a clinical standpoint. In it he compares the success hitherto obtained in operations performed for these diseases with that of 100 cases treated in the gynecological department of the University Hospital at Berlin. Till recently, the best ovariotomists have stated that almost every woman affected by the above disease who was operated on, died soon after the operation. This opinion, together with the faint prospect of prolonging life, even if recovery did happily occur, caused all interference to be deprecated as much as possible.

Quite lately, however, some operators have advised that even malignant neoplasms of the ovaries, if diagnosed, be removed, supporting their opinion by cases in which the operation added years of health to the life of the woman.

The question as to the desirability of operating involves many considerations—*e. g.*, Is there a prospect of removing the whole growth? What progress is the latter making? When should the operation be performed?

Cohn's remarks are based on 100 cases of malignant tumors of the ovaries in which laparotomy was performed; 86 of these operations were completed; in 14 nothing more than exploratory incisions were made. He divides malignant diseases of the ovaries into solid tumors, viz., sarcomata and carcinomata; and into tumors which have more or less fluid contents—viz., cystomata which have undergone cancerous degeneration, papillary cystomata, and finally those which are partly glandular, partly dermoid, with coexisting malignant degeneration.

The possibility of more or less permanent recovery taking place after removal of malignant growths of the ovaries has hitherto received but scanty attention from writers on gynecology, and it is most desirable to settle the question whether the results of ovariotomy in malignant ovarian new formations are really as bad as seems to be generally believed.

Diagnosis is very important, though difficult from a want of definite signs. Sarcoma of the ovary is perhaps the most difficult growth to diagnose; it forms a solid tumor which has usually a flat surface showing here and there traces of previous peritonitic irritation; with sarcomata are generally associated menstrual irregularities and extreme anæmia.

Ovarian carcinoma presents rather more characteristic signs. It should always be suspected when a solid ovarian tumor is found, which, while still of moderate size, causes ascites and anasarca of the limbs (without coexisting cardiac, pulmonary, or renal disease) and an emaciation which begins slowly and then progresses rapidly.

The diagnosis of cysts that have undergone cancerous degeneration (except papillary cysts) mainly depends on the following points. A cyst is discovered which suddenly begins to increase rapidly, leading to ascites, to œdema of the lower limbs, and to deterioration of the general health; in favorable cases, direct palpation of the indurated nodules in the walls of the tumor is possible. Papillary cysts are divided by Cohn into two classes: (1) those in which the papillæ are confined to the inner surface of the cyst, and (2) those in which they have reached the outer surface. The first group can sometimes be diagnosed by tapping, if the operation is very successful and yields histological elements derived from the villi. The second group is more easy to diagnose, for as soon as the papillæ reach the surface of the cyst they involve the adjacent peritoneum, and when this has occurred the characteristic irregular masses of varying consistence can be felt on the surface, both of the cyst and of the peritoneum (best in Douglas's pouch), especially on bimanual exploration.

Examination of the ascitic fluid which is always present is still of doubtful utility, some authors considering the presence of certain groups of cells as proof of the malignant nature of the growth, while others deny such significance. A blood-stained peritoneal fluid associated with an ovarian growth is,

however, a very common occurrence with papillary degeneration. Moreover, in the latter, both ovaries are very commonly diseased.

As regards tapping for the sake of diagnosis, Cohn considers it a bad practice in most cases, though allowable where there is great obscurity and difficulty —as, for instance, where it cannot otherwise be ascertained whether the tumor is ovarian or not. If, however, the diagnosis is merely a question of malignancy or non-malignancy, tapping is to be discountenanced, since malignant growths often spread with greater rapidity after it.

Exploratory incisions are often necessary to settle the question whether the growth can be removed or not.

Cohn next discusses the wisdom of operating in malignant diseases of the ovaries, and entirely dissents from the view generally taken, namely, that the prognosis in such cases operated on is practically hopeless.

This, indeed, has been almost universally taught, though of late the prognosis for sarcoma has been admitted to be somewhat better. From a study of his series of cases, he thinks that if the tumor is more or less freely movable, the retroperitoneal glands not too extensively affected, and no very large malignant deposits can be felt on the peritoneum—if, in short, the operation presents no especial difficulties, the only objection to it is the fear of a rapid return of the disease.

Cohn then gives the results in the 100 cases above referred to:

86 completed operations—

(1) 10 cases of sarcomata were operated on: 5 recovered; 3 died from operation: in 2 the disease returned (once 1, once 2 years afterward) and proved fatal.

(2) 11 cases of carcinomata were operated on: 4 died from the operation; in 3 the disease returned and caused death; 4 cases recovered.

(3) 14 cases of proliferous cystic glandular carcinomata: 2 died from the operation; 4 died from a return of the disease; 5 recovered and were lost sight of; 2 more recovered and were well 3 years; another was well 8 months after the operation; in yet another, the growth returned and the operation was repeated, the patient being well 8 months after second operation.

(4) Mixed tumors. *a.* 1 dermoid sarcoma—recovery, good health 4½ years. *b.* dermoid carcinomata: 2 cases; in 1 the disease recurred 8 months later; the other recovered and was in good health 6 months after operation.

(5) Myxomata. 3 cases were operated on: 2 died 3 days after operation; 1 recovered and was well 5 months after operation.

(6) Proliferous papillary cysts. *a.* Innocent (by these, Cohn means those which either were not microscopically examined, or those in which the cancerous nature was not clear)—22 cases operated on: 2 died from operation; 20 recovered. *b* Malignant—14 operations: 2 died from operation; 4 from a recurrence of the disease; the rest recovered. *c.* Suspected of malignancy, 8 cases: 1 died; 7 recovered.

Exploratory incisions—14 cases: 3 died from operation (1 papillary tumor, 1 myxoma, 1 carcinoma); 11 recovered.

Only 20 per cent of the whole number of patients operated on died from the operation, which, Cohn points out, is a much smaller proportion than that shown by previous statistics. As regards the liability to recurrence, the sar-

comata showed least, the papillary growths most, tendency to recur. Taking the 86 cases of completed operations, and estimating the number of women under observation for at least one year, and in whom during that period no recurrence took place, as many were completely cured as died from the operation.

Cohn concludes from his researches that when an ovarian tumor is discovered which can be diagnosed as being other than a mere hydrops folliculi or a parovarian cyst, if there is reason to think that it is a proliferous tumor, and especially if it affects both ovaries, immediate ovariotomy is indicated.

Notes on Parovarian Cysts and their Treatment.

Since the days of Lieutaud and Velpeau, small rudimentary cysts arising outside the ovary have obtained recognition; their origin in the broad ligament by cystic dilatation of the canal of Rosenmüller, has been demonstrated by Broca and others. Bird at an early date called attention to their surgical treatment and contents, and in recent times the question of certainty in their differential diagnosis from ovarian tumors, the possibility of radical cure, the nature of their contents, and the pathology of the subject, have all met with full investigation at the hands of the most able authorities. The description of these tumors as given by the majority of authors is as follows: "They are unilocular cysts, situated in the neighborhood of the ovary, but always independent of that organ and characterized (1) by containing a liquid, clear and limpid as spring water, of low density and with little or no albumen; (2) by having thin walls, transparent and but slightly vascular; (3) by their benign character and the ease with which they are cured by simple tapping.

Much discussion has arisen on the above points. As regards the exact source whence these tumors spring, many opinions have been given. Dr. Terillon admits (*Annales de Gynécologie*, December, 1885) that the broad ligaments may be the seat of cystic tumors of varied nature and multiple origin, though he insists that the most frequent variety consists of those which contain a limpid, not stringy liquid, and spring from the parovarium or analogous organ (called the organ of Rosenmüller), and for which the appellation *parovarian* should be retained. As regards the unilocular constitution and contents of these tumors, there is no hard and fast rule; in some cases cysts of the broad ligaments are multilocular, and their contents resemble those of ovarian tumors, just as the liquid contents of true ovarian tumors sometimes resemble exactly those of tumors considered peculiar to broad ligament cysts. The probable truth is that the clear, limpid, non-albuminous fluid of a low specific gravity is diagnostic of a cyst arising from the remains of the Wolffian body, while in other cases the cyst is probably of ovarian origin, having its base of implantation in the broad ligament, or being incarcerated within its folds. The relations of these cysts to the neighboring organs are interesting; when the tumor has unfolded the fimbriated extremity of the tube it comes in contact with the hilum, and, continuing to develop, carries the ovary on one side; should the cyst grow toward the uterus, it renders the latter more or less immovable (an important point in diagnosis). In rare instances it strips up the peritoneum before it, becoming thus extraperitoneal; in some cases the Fallopian tube is found stretched

over the tumor as a bridle. The ovary itself may be atrophied, hypertrophied, only slightly altered or normal. The diagnosis of parovarian cysts from cysts of the ovary is not easy; no one sign can be said to be pathognomonic, the following characteristics are, however, of value: Slow development, good general condition of the patient, and especially only medium fulness of the sac, which is but little distended. Briefly, it may be said that when a unilocular cyst, slowly developed, occurs in a young woman whose general health is good, and when the liquid obtained by puncture is clear, limpid, not stringy, and presents the necessary features on analysis, the diagnosis of parovarian cysts may reasonably be made.

TREATMENT.—Medical treatment is of no avail; surgical treatment may be either palliative or curative. For a long time simple puncture of the cyst was considered quite sufficient to insure a permanent cure, but more recent researches have demonstrated that many of these so-called cures were only temporary, and the more radical treatment of excision was finally necessary. The author illustrates this point by eight cases.

In all of these cases the diagnosis of parovarian cyst was certain; in all, the fluid showed the usual characteristics—low density, small amount of albumen, absence of paralbumen, somewhat high proportion of chloride of sodium, very small amount of solids after desiccation, and, lastly, perfect transparency, with color little or not at all marked.

The author has collected over seventy cases in which a cure was claimed after one tapping, but in all these cases the mistake had been made of not allowing a sufficient time to elapse before considering the cure permanent; the sac of the tumor may lie empty and shrivelled for months or even years, and yet fill again with the fluid. So difficult is it to fix any time after tapping at which a cure can be judged complete, that one is justified in considering cure after puncture as the exception and relapse as the rule.

Tapping with subsequent injection of iodine. The author only mentions this treatment to condemn it.

Extirpation. There does not appear to be any objection to this procedûre, and in the hands of many surgeons the success obtained has been very great. The author comes to the following conclusions:

(1) Parovarian cysts, the fluid contents of which are limpid, not stringy, and devoid of paralbumen, return after complete evacuation of their contents.

(2) This return, though usually slow, and possibly occurring only after an interval of three or four years or more, may occur within a few months.

(3) The interval of time between tapping and return of the fluid is such as to simulate complete cure, and has proved a source of error.

(4) It is difficult to say exactly in what proportion of cases the tumor returns, but is is more often the rule than the exception.

(5) There are some well-established cases, though few, in which a complete cure has been obtained after one or more tappings.

(6) Ought tapping, therefore, always to be practised in supposed cases of parovarian cysts?

(7) Removal, complete or incomplete, is indicated after relapse; the results are good, the mortality being below fifteen per cent.

(8) Removal is preferable to injection of iodine.

Unilateral Pyokolpos.

Dr. Ludwig Kleinwächter, in the *Zeitschrift für Geb. und Gyn.*, xi. r. 260, describes a rare form of vagina duplex, in which one side is normal or nearly so, while the other is fully developed in its middle portion, but closed at both extremities.

"M. A., æt. forty-five; menstruation normal till lately, when, owing to the approaching climacteric, some irregularity has set in. Has always enjoyed good health. Confined seven times (25, 24, 23, 21, 19, 13, and 12 years ago). When first pregnant, she noticed that a tumor was forming in the neighborhood of, and with a tendency to protrude from, the vagina. It did not increase much, and soon ceased to give her any trouble. In the winter of 1883–84, the tumor again began to grow, gradually increasing till it reached the size of a fist, protruded from the vagina, and caused the patient difficulty in walking. About July 1, 1884 (three weeks ago), suddenly, and without much pain, pus was discharged from the tumor, the latter immediately becoming smaller. There has never been any urinary trouble, nor has her general health suffered."

On examination, Kleinwächter found the external generative organs normal. The anterior vaginal wall protruded from the vagina, forming a swelling of the size of a small apple, closely resembling a prolapse of the anterior vaginal wall. About the middle of the protruding fluctuating mass (corresponding to its summit) was an opening as large as a pin's head, out of which trickled healthy looking pus. Pressure caused a gush of pus to take place. A fine probe could readily be introduced through this opening for a distance of four inches without causing any pain, its point evidently passing into a cavity of considerable size, which, however, had no connection with either urethra, bladder, or vagina. The latter appeared somewhat smaller than normal. The size, shape, and position of the uterus could not well be made out, owing to the obstructing tumor. The meatus urinarius was slightly displaced downward.

A director was introduced into the opening in the swelling, and its wall freely incised both upward and downward, allowing about two ounces of laudable pus to flow out. To prevent adhesions from taking place, a semilunar piece was then excised from the anterior wall. The free opening thus formed closely resembled the ordinary vaginal aperture, and was situated immediately above the proper vagina. On introducing a speculum, the walls were found exactly to resemble those of a case of chronic catarrhal vaginitis. The parietes were very red, supplied with rugæ and greatly enlarged papillæ, just as they are met with in chronic granular catarrh. The cavity formed a wide cylindrical canal, ending above in a cul-de-sac, but readily admitting a tubular speculum, 1¼ inches in diameter. No trace of a portio vaginalis could be discovered. The thickness of the wall between this blind canal and the vagina amounted to several millimetres.

Microscopical examination of the portion removed showed nothing unusual. From without inward epidermis, dermis, corium (with the usual papillæ) were to be seen, followed by a fairly thick layer of subcutaneous connective tissue, supplied by numerous relatively wide vessels. Then came a mucous

layer consisting of large stratified squamous epithelium cells, with a free surface bounding the cavity. The same kind of epithelium lined the whole internal surface of the canal; the fluid contents were found to consist of ordinary pus.

The further history of the case may be given in a few words. The cavity was irrigated with a carbolic lotion till the incised edges had healed, and afterward astringent injections were used to cure the catarrhal condition. Fifteen days after the operation she returned home, free from her previous trouble.

The internal genital organs were not carefully explored until the wound had healed.

The vagina proper has a normal width, and measures 3¾ inches in length; the uterus belonging to it has a normal length, though somewhat narrow. It does not lie in the median line, but to the right of it, and curves outward in that direction. The right ovary is normally situated. The blind canal is 3¼ inches long, and somewhat wider than the vagina. Its lower end lies a little above the vagina, further on it runs parallel to it, so that its course as a whole tends to wind spirally round the vaginal canal. On bimanual examination, there is found lying immediately above the convex end of the blind sac, though apparently not connected with it, a cylindrical body as big as a filbert, passing outward and to the left, and with an enlarged outer end.

Its inner end is in contact with the cervix, though whether actually continuous with it or not could not be determined. The left ovary is *in situ*, but smaller and softer than the right. The wall between the vagina and the blind canal appears moderately thick, and is now thrown into folds, owing to the diminished tension. The patient has an unusually large pelvis, especially as regards width.

There are two ways in which an imperforate or rudimentary formation of the vagina may be brought about. Either the hollowing out of Müller's body (from which it is formed) may be retarded, or, after Müller's body has already become tubular, it may again become closed in different parts of its length, in consequence of inflammatory processes. The first has been called primitive, the second secondary atresia. It is by no means unlikely that numerous so-called vaginal cysts have been really rudiments of a vagina, and that the fluid contained in them is the result of inflammation during fœtal life. They would then be cases of secondary atresia. Those, on the other hand, in which the second vagina is well formed, except that the upper and lower ends are closed, are instances of a primitive atresia, not necessarily involving any accumulation of fluid. The latter will only form when either excessive secretion is induced by some external cause, or inflammation sets in, or if extravasation of blood takes place—*e. g.*, from a wound. A common source of irritation is met with in pregnancy and parturition; the mechanical and physiological alterations being quite sufficient for the purpose. This is illustrated by the above case as well as by one published by Smolsky, in which the existence of the second vaginal canal was only noticed when pregnancy set in. Pregnancy and parturition may, of course, have a similar influence on a case of the primitive variety. This appears to have happened in those published by Gräfe and Freund, in which the so-called congenital cysts seemed to grow at each confinement.

Whether the sac forms a pyokolpos or hæmatokolpos, does not depend on its origin, but on the degree of irritation caused by pregnancy, or the extent of injury done at the birth.

Accompanying the vagina duplex we may have a double uterus, though this association is not essential.

The clinical features of unilateral pyo- or hæmato-kolpos differ in important points from one in which the collection of fluid occupies the whole length of one-half of a double genital canal (utero-vaginal). The onset of menstruation and its recurrence do not affect the unilateral imperforate vagina. All the symptoms characterizing the cases in which a uterus duplex accompanies the vagina duplex (regular recurring pains and the formation of an abdominal tumor, in spite of the menstrual flow) are absent. Either stationary vaginal cysts are present, or no indication whatever of any malformation of the genital system is found. Only when increased secretion or hemorrhage takes place into the second closed vagina do symptoms arise; these are mainly mechanical in nature—*e. g.*, the vagina may be encroached upon, or dysuria is complained of. If the swelling be left to take its natural course, the fluid contents are sooner or later discharged.

If the rudimentary vagina is only represented by small cysts, diagnosis is difficult, if not impossible; evacuation of the fluid contents assists to some extent; if the swelling is due to remains of the second vagina, the following characteristics generally hold good: the cyst lies more deeply, its wall is lined with stratified squamous epithelium, and is supplied with bloodvessels, muscular tissue, and papillæ. But on none of these features can absolute reliance be placed; the microscopical points of distinction between these cysts and those due to other causes are, therefore, very indefinite.

Some help is got by the relation of the malformed to the healthy half; if it tends to take a spiral course and resembles the latter in size, if, moreover, the naked eye and microscopical characters resemble those found on the healthy side, and especially if the uterus is bifid, there are good grounds for diagnosing the case as one of vagina duplex.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

UNDER THE CHARGE OF

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Death by Drowning.

Draper, of Harvard University, has recently communicated to the Massachusetts Medico-Legal Society (*London Medical Record*, Jan. 15, 1886) the results of an inquiry into the signs, etc., of death by drowning, based on a personal inspection of 149 cases. In summarizing the anatomical proofs of

death by submersion, he divides them into two groups, viz., those indicating the generic cause of death (asphyxia), and those especially showing that the death was by drowning. Among the former he adds nothing which is new. The latter may, however, be mentioned here, although they are for the most part, if not wholly, what are everywhere regarded as signs of death by drowning. They are fine froth at the lips and nostrils, and in the trachea and bronchi; water in the bronchi, with or without mud or other foreign matters; extreme distention of the lungs, with superficial emphysema; water in the small bronchioles and in the vesicles, as shown by the free escape of fluid from the cut surface of the lung; thin, clear fluid in the pleural cavities; water, particularly muddy water, in the stomach. As confirmatory signs are mentioned *cutis anserina;* the presence of objects clenched in the hands and clearly derived from the water in which the body was found; blanching of the palms and soles; marked lividity of the face, with injection of the conjunctivæ.

Atropine Poisoning.

Kratter contributes a paper of considerable value on poisoning by atropine and belladonna (*Vierteljs. f. gericht. Med.*, Bd. xliv. S. 52–95, 1886). It is based on a careful study of eight cases within his own experience, and is mainly concerned with the best methods for detecting the poison in the body. The conclusions at which he arrives are as follows:

(1) The detection of the poison in the corpse is certain, provided proper methods are employed.

(2) The urine is especially valuable for this purpose, as the alkaloid appears to be almost entirely excreted by the kidneys, and apparently without change. It can even be found there in cases which have not terminated fatally.

(3) The microscopic, especially the crystalloscopic, examination in polarized light of the fine crystalline residue of the urine is recommended as a preliminary step in the process of detection, since the crystals of sulphate of atropine are tolerably characteristic in form.

(4) But while the crystalloscopic test is not to be neglected, not perhaps the Gulielmo-Brunner chemical test (peculiar odor on heating with concentrated acids), positive proof of the presence of atropine is only to be found in the well-known action of the poison on the pupil. And the best of all eyes for this purpose, because much the most sensitive, is the human eye; next comes that of the cat. The eyes of dogs and rabbits are not to be relied on, if the atropine exists only in small quantity.

(5) Apropine shows great resistance to putrefactive decomposition, and therefore may be looked for in bodies dead for some months.

(6) As the atropine is rapidly excreted in the urine, it may happen that if the person survives for a few days, the poison cannot be found in the body.

Tests for Atropine.

Professor Flückiger contributes an interesting paper on this subject to the *Pharmaceutical Journal* (Ser. 3, vol. xvi. pp. 601, 602, 1886), which is mainly the outcome of A. W. Gerrard's discovery (*Ibid.*, xiv. pp. 718 and 729) that

the mydriatic alkaloids possess a greater alkalinity than other natural alkaloids, as is shown by the fact that atropine and hyoscyamine precipitate mercuric chloride, while the other natural alkaloids fail to do this. Flückiger confirms this observation, and gives still further proof of the exceptional alkaline power of the mydriatic alkaloids by stating that these alone among alkaloids have the power to redden a solution of phenol-phtaleïn. He therefore recommends the use of mercuric chloride and of phenol-phtaleïn for the detection of atropine and hyoscyamine. Obviously, however, one must, before applying the reagent, exercise the greatest care in freeing the alkaloidal solution from the presence of mineral alkalies or alkaline carbonates. The author gives a modification of some of the other tests for atropine. For example, he recommends that a milligramme of atropine and an equal quantity of nitrate of soda should be rubbed together on a white slab by means of a glass rod moistened with a very little strong sulphuric acid (sp. gr. 1.84); then a little sodium hydrate is rubbed in a mortar with absolute alcohol, so as to form a saturated solution, which is added drop by drop to the oxidized alkaloid on the slab, when a red or violet color is developed.

The Alkaloids of Jaborandi.

Prof. Harnack (*Arch. f. exp. Path. u. Pharm.*, Bd. xx. S. 439–445) gives the result of a careful examination, chemical and toxicological, of the new alkaloid, pilocarpidine, discovered in the leaves of jaborandi by Merck, of Darmstadt. Pilocarpidine ($C_{10}H_{14}N_2O_2$) decomposes easily into a new base, jaboridine ($C_{10}H_{12}N_2O_3$), just as pilocarpine ($C_{11}H_{16}N_2O_2$), the formerly discovered alkaloid of jaborandi, decomposes into jaborine. The relationship of pilocarpine to nicotine ($C_{10}H_{14}N_2$) was pointed out some years ago by Harnack and Meyer. The existence of this relationship is now more fully demonstrated by the discovery of pilocarpidine, as a comparison of their formulæ will show. Indeed, it is possible that pilocarpidine is a dihydroxyl-nicotine. This alkaloid has the same, though weaker, action on the animal organism as pilocarpine; and a like result was obtained in comparing jaboridine with jaborine.

Alleged Cocaine Poisoning.

Spear (*Medical Record*, New York, November 14, 1885) relates a case of apparent poisoning by cocaine subcutaneously injected. The case was that of a drunken soldier who, for the alleged purpose of sobering himself injected what there is every reason to believe was a solution of cocaine. In half an hour, without previous exhilaration or excitement, he fell into a deep sleep. Two hours later, when he was visited by a surgeon, he was found to be perfectly comatose, face cyanosed, pupils very much contracted, skin pale and bathed with perspiration, respiration very slow and shallow—not stertorous, pulse slow and of fair volume. The surgeon diagnosed the case as one of opium poisoning and treated it accordingly, using the stomach-pump, which, however, brought up nothing, injecting atropine hypodermatically, and spanking the legs and buttocks, etc. After taking coffee several times the patient finally vomited, and showed signs of return-

ing consciousness in about an hour and a half from the commencement of the treatment. Three hours later he was able to walk alone, but was very sleepy, though not allowed to sleep longer than five minutes at a time. Three and a half hours after this he was permitted to sleep for an hour, and was easily waked.

It appeared from inquiry afterward, that the soldier had been addicted to the use of cocaine to allay a craving for alcoholic stimulants, and it was proved that he had recently bought ten grains of muriate of cocaine, which he had dissolved in water and injected a syringeful every few hours, commencing thirteen or fourteen hours before he injected the final dose. He had used the whole of the cocaine.

This case is interesting as one of the first recorded cases of cocaine poisoning. It is highly doubtful, however, whether it is a real case of poisoning by cocaine, since this drug has never had attributed to it so great a toxicity as the circumstances of this case imply.

Poisoning by Decomposed Codfish.

Berenger-Feraud (*Annales d'hyg. publ.*, Ser. 3, t. iv. p. 516) thus concludes a lengthened inquiry into this subject: It is established beyond doubt that decomposed dried codfish is sometimes capable of producing poisonous effects. These effects are similar to those of cholerine, or cholera nostras, consisting mainly of violent gastro-intestinal irritation, which rarely ends fatally. The fungus which is often found growing on such fish, is not the poisonous agent. It is the putrid flesh itself which acts poisonously. As a prophylactic measure, the author recommends repeated steeping of the fish in a large quantity of water, followed by a thorough cooking. If in spite of this the cod retains its putrid odor, it ought to be rejected.

The author compares the poisonous action of putrid cod with that of putrid sausages, and remarks that though the latter is generally much more energetic and serious, the poisonous agent is much the same in both. The main difference lies in the fact that the sausage poison is more readily absorbed than the cod poison, and thus reaches and attacks vital organs.

Poisoning by Mussels.

A committee appointed by the German Government, and presided over by Virchow, has recently completed its investigation of a number of cases of fatal poisoning from the eating of mussels, which occurred lately (*Lancet*, December 5, 1885). It was supposed, in accordance with a long-standing though frequently disproved belief, that the poisoning was due to the mussels having contained copper with which they had become impregnated while adhering to two vessels from which they had been gathered, and which were supposed to be copper-sheathed. The commission was able to show that this was not the case, and it is therefore to be hoped that in the future we shall cease to attribute the occasional poisonous action of mussels to copper. The mussels were found to be of a different species from the edible mussel, though closely resembling it, and they were proved to contain a poisonous alkaloid, apparently identical with curarine.

Ergot.

Dr. Kobert (*Schmidt's Jahrbücher*, Bd. 207, No. 9, S. 237, 1885), in continuation of his well-known investigation of the active constituents of ergot, now gives an account of all the cases of ergot poisoning published during the last hundred years or so, but which have not been reported in the *Jahrbücher*. All cases of ergot poisoning he designates as sphacelic acid poisoning, since he has discovered that the main poisonous constituent of ergot is that acid. Many of these cases are of interest to the practitioner, as affording an indication of the extent to which ergot may be administered medicinally without producing gangrene. In one case, the patient, a woman of twenty-five years, suffered from gangrene of the extremities two months after she had taken 20 centigrammes (3 grains) of ergot daily for a period of one month. In another similar case, a boy of thirteen received the same dose for a period of two months; but ten days later fever set in with thoracic pain, which in two days developed into gangrene of the lungs. These two cases also show that the action of sphacelic acid may remain latent for a considerable time.

Among the other cases summarized by Kobert are three of acute ergot poisoning which, on account of the rarity of this form of poisoning, deserve notice. They occurred in Russia in 1884. Three pregnant women had taken large doses of ergot, and all three died within a very short time. The most prominent symptoms previous to death were feebleness of pulse, violent thirst, vomiting, bleeding from uterus, and unconsciousness. The post-mortem appearances were tolerably alike in all: skin icteric; blood escaping from genitals (in one case a small fœtus embedded in the coagula); several ecchymoses in subcutaneous tissue, also under pleura and pericardium, former visible through the skin in many places in the limbs; extravasations of blood also under peritoneum, in lungs, and in kidneys. In the uterus of one there was a four months' fœtus, with sanguineous mucus in the vagina; in the uterus of another, a four to six weeks' fœtus, with loose clots of blood between the villi of the chorion and the uterine wall; the uterus of the third, as already mentioned, had discharged the fœtus. The contents of the stomach and intestines were dark colored, and were found to consist largely of ergot. The mucous membrane was pale in some places, reddened in others, and ecchymosed in one case.

Kobert also quotes some cases in which cataract of the lens followed the prolonged taking of ergot. Such cases are not very rare. Finally, Kobert advances the opinion that in those cases of ergotism in which the spinal cord is affected, sphacelic acid probably causes the changes in the cord by contracting its bloodvessels. For the benefit of those who are not familiar with the results of Kobert's earlier communications, it may be stated that this effect on the bloodvessels is that to which Kobert refers all the poisonous activity of sphacelic acid.

Influence of Age on the Action of Strychnine.

F. A. Falck (*Arch. f. d. ges. Physiologie*, xxxvi. p. 285, 1885) has extended his experiments on this subject to guinea-pigs and mice—his former experiments were on rabbits. He sums up the results of all his experiments in the statement that the newly born animal is relatively very insensible to the

action of strychnine, but that the sensibility very rapidly increases until the tenth day in the rabbit, and the fifteenth in the mouse, when sensibility is greatest. After this period, as age increases the sensibility diminishes until maturity is reached, when it becomes constant and normal.

Chlorate of Potassium.

V. Mering has published an exhaustive memoir on the physiological, toxic, and therapeutic effects of this salt (*Das Chlorsaure Kali*, Berlin, 1885, pp. 142). He has employed what appears to be a satisfactory method for the determination of the chlorate in the urine, etc. With the help of this, he shows that nearly the whole of the chlorate passes through the body unchanged, and almost entirely reappears in the urine—*e. g.*, he recovered 4.62 grammes out of 5 grammes which he had himself swallowed.

Based, however, on the fact that the blood outside the body reduces the chlorate, he admits the probability of such a reduction taking place inside the body, but only to a very limited extent. And, indeed, this appears to be proved by the chocolate color of the blood of animals poisoned by the chlorate, the chocolate color being due to the formation of methæmoglobin. But as such blood quickly undergoes change, returning to the normal after death, it is advisable to make the post-mortem in cases of chlorate of potassium poisoning as soon as possible. V. Mering further shows from experiments on animals, and also with blood outside the body, that elevation of temperature and decrease of alkalinity of the blood increase the amount of the reduction. He offers this as an explanation of the variability in the poisonous action of the chlorate. Febrile persons are therefore more susceptible than others to the action of the salt, more especially if the alkalinity of the blood is diminished by the drinking of acid lemonades, etc.

The author gives a description of the typical symptoms of poisoning by the salt, which are chiefly obstinate vomiting, profuse diarrhœa, great dyspnœa, marked cyanosis, and feebleness of heart. Post-mortem: blood, chocolate-brown; organs generally little changed.

Arsenic.

Chittenden and Herbert E. Smith (*Medico-Legal Journal*, vol. iii. pp. 145–148) report the analyses of the organs and tissues in two cases of arsenical poisoning—the one by arsenious acid, the other by Paris green (aceto-arsenite of copper). In both cases merely a trace of arsenic was found in the brain, although a considerable quantity was found elsewhere. This, they say, affords additional evidence of the view already advanced by Chittenden, that in poisoning with arsenic the presence of an appreciable amount of poison in the brain is a reliable indication of the administration of a soluble and diffusible form of arsenic—*e. g.*, sodium arsenite.

Toxicity of Salts of Copper.

Considerable difference of opinion exists as to the toxicity of copper salts, some authorities maintaining that they are highly poisonous, others that they are not, unless in very large doses. The question as to which is right is of

some importance, since copper is a common adulterant of pickles, etc., and otherwise occasionally contaminates food. PROF. DUMOULIN (Ghent) has therefore recently undertaken the reinvestigation of the subject, results of which are reported in the *Semaine Médicale*, December 2, 1885. His experiments were made mainly on dogs and rabbits. Doses of sixty to ninety grains of cupric sulphate had no serious effects. The subacetate (verdigris), the carbonate, the oxide, and the oleopalmitate were similarly tried, though in somewhat smaller doses, and were found to be not more harmful than the sulphate. Vomiting was produced when the dose was large. The salts were even, in some instances, administered daily for a year without leading to a fatal result. Observing that one of the dogs which was suffering from impetigo became cured of the eruption during the administration of the copper, the author tested the value of cupric sulphate, in one grain doses daily, in the treatment of impetigo and various other skin diseases in children, with good results.

The conclusion of medico-legal value to be drawn from the author's experiments, is that foods containing copper salts in small quantity are not likely to have injurious effects even though consumed over a long period of time. In spite of this, however, it would be unwise for medical officers of health to regard adulteration with copper as other than injurious.

ARSENICAL POISONING OF A CHILD THROUGH MOTHER'S MILK.

BROUARDEL and G. PONCHET (*Annales d'hygiene publ.*, t. xiv. pp. 73–86) have reported to the Société de Médecine legale de France the results of an inquiry into an important and probably unique case of poisoning of an infant by arsenic, where it was alleged that the poison had been introduced through the milk of the mother, whom her husband had unsuccessfully endeavored to kill by means of arsenic. The mother recovered after vomiting and diarrhœa, but the infant of two months succumbed after exhibiting the same symptoms. The body of the child was exhumed twenty months later, and after a careful chemical analysis of the cadaver and its surroundings, the authors were satisfied that arsenic was present in the body to the extent of about five mgms., a quantity, in their opinion, sufficient to have killed so young an infant. They afterward made experiments on nursing women, guinea-pigs, rabbits, and dogs, and found that arsenic, when administered to the mother, passes freely into the milk, and, in the case of the lower animals, is detectable in the bodies of the sucklings. In one case, that of the dog, they succeeded in killing one of three pups by administering arsenic to the mother, although the mother recovered.

RELATIVE TOXICITY OF THE ORGANIC AND INORGANIC CONSTITUENTS OF THE URINE.

It is known that the toxicity of normal human urine when injected into the veins is mainly due to the inorganic constituents. LÉPINE and AUBERT (*Compt. rend.*, C. I. No. 1) have now found that the toxicity of urine from fever patients is, on the other hand, largely due to the organic constituents. 60 c. c. of normal urine, per kilogramme of weight of animal, sufficed to kill a dog; the ash of 65 c. c. produced the same result. But if fever urine were employed, 25 c. c. of the urine itself, or the ash of 40 c. c., proved lethal.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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Disinfection.

A series of papers on disinfection will be found in the *Report of the Medical Officer of the Local Government Board.* The first, by Dr. Klein, confirmed experiments previously performed, which showed that swine fever could be communicated to healthy pigs through the air by placing them in the same stable with diseased animals, but so separated from them that no bodily contact could take place between the diseased and the healthy, and also showed that infection did not take place if chlorine were present in the air of the stable.

Experiments with sulphurous acid showed that when the animal used for imparting infection was suffering with severe swine fever, healthy animals introduced into the stable, the air of which was charged with this gas, contracted the disease and died of it. When, however, the disease-giving animal suffered in a mild form and was free from severe pulmonary symptoms, no infection took place.

A second series of experiments proved that exposure of the blood of splenic fever for half an hour to a $3\frac{3}{4}$ per cent. solution of phenylpropionate of sodium deprived it of its infecting power.

A third series of experiments by Dr. Klein and Mr. Lingard showed that the steeping of the tuberculous material of known infective activity in $1\frac{1}{2}$ per cent. solution of either phenylpropionic or phenylacetic acid rendered it inert. A less than 10 per cent. solution of phenolsulphonate of sodium was inoperative, but a 15 per cent. solution used for steeping tuberculous matter for sixteen hours or more deprived it of its infectivity. Other experiments by Dr. Cash showed that guinea-pigs, which were given daily doses of four grains, and rabbits nine grains of phenolsulphonate of sodium, were found to be not less susceptible than other animals to the virus of tuberculosis. The administration daily of about $\frac{1}{100}$th of a grain of corrosive sublimate appeared to confer on guinea-pigs and rabbits some power of resisting the virus of anthrax.

Another paper in the same report gives an account of experiments with various apparatus for disinfecting by means of dry and moist air, by Dr. Parsons, who was led to the following conclusions:

1. With the exception of spore-bearing cultivations of the bacillus of anthrax, all the infective materials experimented on were destroyed by an hour's exposure to dry heat of 220° F., or five minutes' exposure to steam at 212° F. Spores of bacillus anthrax required for destruction four hours' exposure to dry heat of 220° F., or one hour's exposure to dry heat of 245° F., but were destroyed by five minutes' exposure to a heat of 212° F., in steam or boiling water.

It may be assumed that the contagia of the ordinary infectious diseases of mankind are not likely to withstand an exposure of an hour to dry heat of 220° F., or one of five minutes to boiling water or steam of 212° F.

2. Dry heat penetrates very slowly into bulky and badly conducting articles, as bedding and clothing; the time commonly allowed for the disinfection of such articles being insufficient to permit an adequate degree of heat to penetrate into the interior.

Steam penetrates far more rapidly than dry heat, and its penetration may be aided by employing it under pressure, the pressure being relaxed from time to time, so as to displace the cold air in the interstices of the material.

3. Scorching occurs at different temperatures with different materials, white wool being soonest affected. It is especially apt to occur where heat is in the radiant form. To avoid risk of scorching, the heat should not greatly exceed 250° F., and even this temperature is too high for white woollen articles.

4. By a heat of 212° F. and upward, whether dry or moist, many kinds of stains are fixed in fabrics so that they will not wash out. This is a serious obstacle in the way of the employment of heat for the disinfection previous to washing of linen, etc., soiled by the discharges of the sick.

5. Steam disinfection is inapplicable in the case of leather or of articles which will not bear wetting. It causes a certain amount of shrinkage in textile materials—about as much as an ordinary washing. The wetting effect of the steam may be diminished by surrounding the chamber with a jacket containing steam at a higher pressure, so as to superheat the steam in the chamber.

6. For articles that will stand it, washing in boiling water (with due precautions against reinfection) may be relied on as an efficient means of disinfection. It is necessary, however, that before boiling the grosser dirt should be removed by a preliminary soaking in cold water. This should be done before the linen leaves the infected place.

7. The objects for which disinfection by dry heat or steam is especially applicable are such as will not bear boiling in water—*e. g.*, bedding, blankets, carpets, and cloth clothes generally.

8. The most important requisites of a good apparatus for disinfection by heat are (*a*) that the temperature in the interior shall be uniformly distributed; (*b*) that it shall be capable of being maintained constant for the time during which the operation extends; and (*c*) that there shall be some trustworthy indication as to the actual temperature of the interior at any given moment. Unless these conditions be fulfilled, there is risk, on the one hand, that articles exposed to heat may be scorched, or, on the other hand, that through anxiety to avoid such an accident the opposite error may be incurred, and that the articles may not be sufficiently heated to insure their disinfection.

9. In dry-heat chambers the requirement (*a*) is often very far from being fulfilled, the temperature in different parts of the chamber varying sometimes as much as 100°. This is especially the case in apparatus heated by the direct application of heat to the floor or sides of the chamber. The distribution of heat is more uniform in proportion as the source of heat is removed from the chamber, so that the latter is heated by currents of hot air rather than by radiation.

10. In chambers heated by gas, when once the required temperature has been attained, but little attention is necessary to maintain it uniform, and in the best made apparatus this is automatically performed by a thermo-regulator. On the other hand, in apparatus heated by coal or coke the temperature continually tends to vary, and can only be maintained uniform by constant attention on the part of the stoker.

11. In very few hot-air chambers did the thermometer with which the apparatus was provided afford a trustworthy indication of the temperature of the interior; in some instances there was an error of as much as 100° F. This is due to the fact that the thermometer, for reasons of safety and accessibility, was placed in the coolest part of the chamber, and that the bulb, being enclosed for protection in a metal tube, was screened from the full access of heat. The difficulty may be overcome by using, instead of a thermometer, a pyrometer actuated by a metal rod extending across the interior of the chamber.

12. In steam apparatus the three requirements above mentioned are all satisfactorily met, and for this reason, as well as on account of the greater rapidity and certainty of action of steam, steam chambers are, in Dr. Parson's opinion, greatly preferable to those in which dry heat is employed.

13. Without wishing to give the preference to one maker over another, he mentions that of the apparatus heated by coal, Bradford's newer machine; of those heated by gas, the Nottingham self-regulating disinfecting apparatus; and of those employing steam, Lyon's patent steam disinfector, in his experiments gave the best results of any in their respective classes.

14. It is important that the arrangement of the apparatus, the method of working, and the mode of conveyance to and fro, should be such as to obviate risk of articles which have been submitted to disinfection coming into contact with others which are infected.

The recommendation of the American Public Health Association, that the following standard preparations should be used as disinfectants, has been adopted by the Iowa State Board of Health.

The preparations are:

1. Chloride of lime, four ounces to the gallon of soft water. For the disinfection of excreta.

2. Corrosive sublimate and permanganate of potash, two drachms of each to the gallon of water. For the same purpose as No. 1.

3. Labarraque's solution (liquor sodæ chlorinatæ), one part to five parts of soft water. For the same purpose as No. 1.

4. Pulverize one ounce of corrosive sublimate and mix thoroughly with nine pounds of plaster; add one pound of chloride of lime, and mix thoroughly. To be sprinkled on the surface of excreta.

5. Corrosive sublimate, four ounces dissolved in one gallon of water; add one drachm of permanganate of potash to each gallon, to give color to the solution. One fluidounce to the gallon of water will make a suitable solution for the disinfection of clothing.

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